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Not Electrical

THE disposition to blame electricity whenever there is a fire of uncertain origin takes a lot of killing.

A year ago when the Dutch Section of the Colonial Exhibition at Vincennes was destroyed, and the electrical installation was said to be responsible, investigations were made which proved the statement to be sheer fiction. And now we learn from our Paris correspondent that an investigation into the cause of the disaster to the steamship *Georges Philippar*, so insistently attributed to electrical causes, has brought out facts which prove that once more has electricity been made the scapegoat with no justification whatsoever.

The installation in the vessel was carried out on the most up-to-date lines. The first engineer, M. Rouquette, in his evidence before the Commission which held the inquiry stated that electricity was the "soul of the ship"; everything that could be electrical was so; and no possible precaution was neglected. He went further and said that if it had been possible to save the ship even that would have been done electrically!

The engines were abandoned at 4.30 a.m.; yet at 8 a.m. electricity was available everywhere and all the electric motors were running and in perfect order. Between the hours mentioned the engines continued in operation without supervision and the steam pressure was maintained as long as possible.

The evidence of M. Rouquette further made it clear that no trouble whatever occurred on any circuit—power, light, bell or telephone; nowhere throughout the entire installation were mains or conductors in direct contact with wood or other inflammable material. Indeed, he was able to show that electricity was the one thing that prolonged the life of the ship, because the electric motor-driven fire pumps were working right to the last moment.

Here, again, we lay to rest with many of its predecessors one more fiction—we present the corpse to the electrical industry and expect that good use will be made of it. We owe it to ourselves that the mind of the public should learn the truth about such matters. They read the false charge which receives widespread sensational publicity in the newspapers, but how often are they given the opportunity of learning of the acquittal? Electricity, so abundant a benefactor of the human family, may leave the court without a stain on its character. Will the "Stop Press" news announce that fact to the world? Even if it does it is always terribly hard work for truth to catch up the lie. Somebody, however, must try to do it, in the confidence that constant denials will wear away a prejudice.

It is this disposition, be it innocent or be it malicious, that dies so hard. What we need to do is to change the disposition or tendency to think that the origin of a fire was very likely electrical because it wasn't this, it wasn't that, and it couldn't have been something else. Eliminate some supposedly impossibles, leave a somewhat possible, and, hey presto, there we have the certainty!

Even as we are writing these lines reports are reaching us regarding the destruction on Sunday afternoon of the pavilion and concert hall on the Lee-on-Solent Pier. The newspaper reports are blaming electricity, and in our efforts to test their accuracy we are availing ourselves of the kind co-operation of Mr. Handley, the borough electrical engineer of Portsmouth. What he has to say will be found on a later page.

E.H.P. Switchgear Rating

IN our issue of March 4th, commenting on the discussion on Mr. Clothier's I.E.E. paper, we referred to the reticence of supply engineers in giving their views regarding standardised performance tests on e.h.p. switchgear. We welcome Mr. H. R. Forbes Mackay's contribution to the discussion published in our Correspondence columns this week, but we should like to assure him that the position as regards switchgear proving in Great Britain is now very much more satisfactory than he appears to indicate, whatever it may have been some years ago. It is true that we have no central proving station, but

we have at least one test-house—that at Hebburn—capable of dealing with short-circuit capacities up to 1½ million kVA. Our deficiency is not due to any technical shortcoming, but to lack of co-operative endeavour, such as would result in the issue of standard test certificates applicable to all designs.

"Ups" and "Downs"

REFERENCE is made on a later page to the exhibition that is now being held at Bush House, London, of products that are being manufactured at Hollinwood by Messrs. Ferranti, Ltd. The event forms part of the celebrations in connection with the jubilee this year of electrical manufacturing operations begun in the year 1882 by the late Dr. S. Z. de Ferranti and his associates. We tell really a sort of preface to the story of that year, memorable in so many ways. As some will recall with Mr. Vincent Ferranti, the present popular chairman, the company has, like many other concerns, experienced both "ups" and "downs" during the fifty years. It is now enjoying years of prosperity after knowing well what adversity means; it knew when to apply the pruning knife, letting some things go and turning to others of greater promise. It is in a strong position when some businesses are not doing so well as they did in past days. The success of Ferranti's to-day is partly due to the fact that their tribulations date back long years ago, and partly to their enterprising adaptability to changed conditions and to the approach of new demands. The salvation of many concerns may lie just there.

Supply Engineers' Committees

WE expect to hear official pronouncements of more than usual interest at the I.M.E.A. annual dinner. The remarkable figures divulged by Mr. Pybus as to growth of sales last year are most encouraging, considering the trade situation. Next year the Minister of Transport should have even more striking progress to record. Nevertheless, probably the most important statement came from Sir Andrew Duncan, who referred to the intention of the Central Electricity Board to set up quite shortly committees composed of engineers owning selected stations and representatives of other undertakings with the object of bringing about complete collaboration within the industry. By this reliance on the spirit behind electricity supply rather than merely on the letter of the law relating to it, "rationalisation" should lose its terrors while retaining its many admitted advantages.

The Contractors' Conference

WE hope that Mr. H. Marryat's paper on "The Trend of Trade" will not prove too big to provoke discussion at the Southport conference of the E.C.A. and Allied Associations next week. To dwell on the present lamentable world situation certainly requires courage, even, we suggest, for a Marryat. No doubt the paper will reflect the author's optimism for the future of the electrical industry in connection with the tremendous work of reconstruction which must take place sooner or later. It is quite safe to forecast a lively discussion on Mr. R. Harrison Watson's paper "Old and New Installation Problems," for such vexed questions as live lead and neutral return, and earthing or insulation always prove irresistible. In emphasising the great confusion that exists regarding numerous regulations designed to govern installation work the author will perform a useful service.

The Inventor of the Oil Engine

THE British are curiously prone to give credit to foreigners for inventions due to their fellow-countrymen. The tendency to describe all heavy-oil engines as "Diesel engines" provides an example. In 1897 Dr. Rudolf Diesel produced his first commercially successful air-injection engine in Germany, since when all heavy-oil engines have been ascribed to his invention. But the airless-injection, or compression-ignition type, which has come so much to the fore of recent years, was invented by Akroyd-Stuart as far back as 1890, and has long been developed on commercial lines in this country. The modern airless-ignition, cold-starting oil engine is therefore definitely a British invention, and the term "Diesel" should be confined to the air-injection type.

Public Lighting Charges

ELECTRICAL progress will be no less rapid because Mr. J. N. Waite, of Hull, trails his coat on occasion. In the discussion on the paper which he and Mr. W. J. Jones, of E.L.M.A., read at Cardiff controversy attached itself chiefly to his claim that ¾d. per kWh could profitably be charged for public lighting. Worked out at the average load factor for all-night illumination this is equivalent to £4 10s. per kW and ½d. per kWh—quite a high price for a good bulk supply load. There is, of course, a snag somewhere, and that is in the cost of distribution to the individual lamp standards. We would have liked to see figures advanced by those who disagreed with the authors on this point, as it is the crux of the whole question. We have no doubt that such details are available, but the discussion would appear to indicate the difference as one of opinion only. As it was, the authors stated that the ¾d. per kWh had proved profitable at Hull, and so we consider that the last word was with them.

The Small Undertaking

IN an article in *The Times*, Sir Arnold Gridley, who was Controller of Electric Power Supply during the war, produces a number of facts and figures in support of regional grouping of distribution, but sees difficulties in the purchasing powers of local authorities and in local jealousies. Mr. Morley New believes that, if all undertakings show the progressive spirit of some, no outside action will be called for. The chief weakness of small distribution authorities is, we believe, that they cannot, or think they cannot, afford to pay and keep men of the right type to obtain consumers. This applies particularly to industrial areas.

Electricity and Gas Departments

THERE has been some talk recently about co-operation between the electricity and gas departments of municipalities with a view to effecting surveys in capital expenditure. We know what this meant in the early days—an attempt to strangle a younger and progressive industry or else to limit its activities to a field that gas was forced to concede. A new way of looking at the subject was brought forward by Mr. F. Price White during the discussion on Mr. Newey's I.M.E.A. paper. He has succeeded in impressing on his committee at Bangor that the gas department must die. The only difficulty is that the capital charges on the gas plant must still be met, so it is to be allowed to linger on, but extensions to the gas mains will not be regarded as necessary to the well-being of the citizens. Is this the beginning of the end?

Rate Relief or Service?

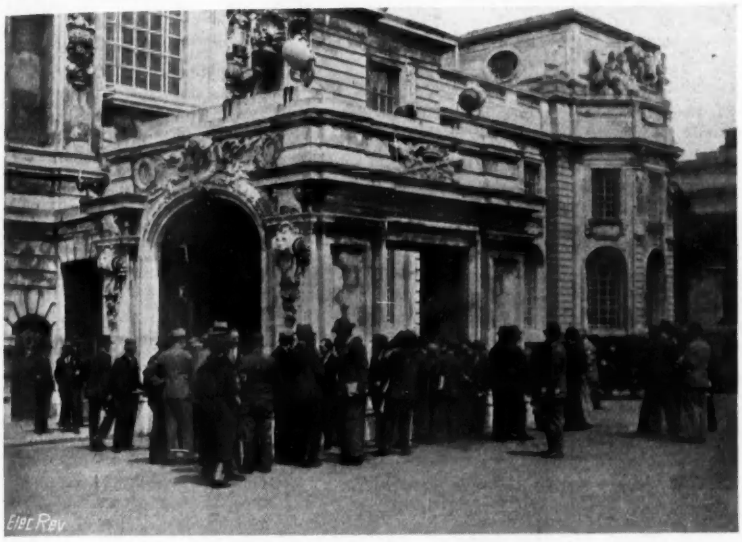
SOME of the members of the Newcastle-upon-Tyne City Council are up in arms against the practice of transferring large sums from the profits of the tramway system to the relief of rates. It says something for the system that it can earn so much these days as to act as a "milch cow," but the practice is a most undesirable one, particularly if, as the protestants aver, the undertaking has a debt of £850,000. A check has been put on municipalities so far as their electricity supply undertakings are concerned, and perhaps tramways also need this protection. We consider that surpluses accruing from these public services can best be employed in extension and improvement, or, better still, in lowering charges to the users. Perhaps the matter will be considered at this week's Municipal Tramways Transport Congress.

The I.M.E.A. Convention

Successful gathering at Cardiff

THE glorious weather last week made visitors to Cardiff all the more regretful that the I.M.E.A. Convention had been abbreviated. A sun, which seemed not to be an all-British product, had its heat tempered by just the right amount of breeze, and shining on the white expanse of public buildings in Cathays Park displayed them at their best. In the small hours, after the evening functions, a full moon, with assistance from the G.E.C. system of floodlighting, showed them in another aspect which we heard described as "subtly exciting."

That Cardiff is in a "distressed area" would be realised with difficulty by those whose acquaintance with the city was limited to the district between the principal hotels and the Assembly Hall and to the excellent tours organised for viewing the surrounding country and also Whitehead's rolling mills



Delegates assembling at the City Hall

(described in our issue of June 10th). And why seek to probe below the surface on occasions such as this? Electrical engineers have little opportunity, as a rule, of withstanding the mental urge to separate truth from illusion. Not that they take these Conventions too easily; the full attendances at both morning and afternoon sessions on Thursday, in spite of the temptation to enjoy the rare sun outside, gave evidence that delegates, both engineers and committee men, with a good sprinkling of our manufacturing friends, had the very practical intention of profiting as much as possible by a comparison of experiences for the benefit of their own undertakings.

But people are what matter most. The "snaps" by our own photographers, here reproduced, indicate that the gathering was, as in previous years, well representative of our industry and that it fully maintained the status of the Convention as the most important (as well as the most looked forward to) meeting of electrical men throughout the year. Yet there were some faces missing that we had hoped to find there; in the family spirit that has evolved any gaps are noticeable.

Unofficial Happenings

Many delegates had left home the preceding week-end and had taken the opportunity made by the Convention's opening two days later than usual to tour the Principality. Their sun-cured complexions contrasted favourably with others who had been long in city pent. The Automobile Association had done its best to enable them to find their way by special I.M.E.A. sign posts. We heard it stated that "John Citizen" (of whom so much was said during the discussion on the street lighting paper) was given to understand that the signs meant "I Must Electrify All."

In addition to the officially announced tours to Porthcawl and Cardiff Castle (for Mrs. Morley New's E.A.W. contingent), Wye Valley, Whitehead's mills, and Cardiff electricity works, extra visits were arranged to Upper Boat power station (South Wales Electric Power Distribution Co.), the power stations of the Powell Duffryn Coal Co. (which has an annual output of some 130 million kWh), Middle Duffryn Coal Co., and Swansea Corporation, and to Bargoed and Windsor Collieries. An informal dance was held at the Angel Hotel on Friday evening, while on Saturday afternoon members of the E.A.W. were guests of Mrs. Harry Ellis at a garden party.

A special reference is due to the B.T.-H. lighting of the Assembly Hall, where the indoor functions were held. The heavy metal suspension fittings containing orange and white Mazda lamps were supplemented by two hundred 60-W pearl lamps of various colours in the cornices on the two long sides of the hall. In eight alcoves lamps shone upwards through skilfully arranged ferns giving a very lovely pastel effect in which delicate blues and greens were predominant.

The Civic Week Exhibition

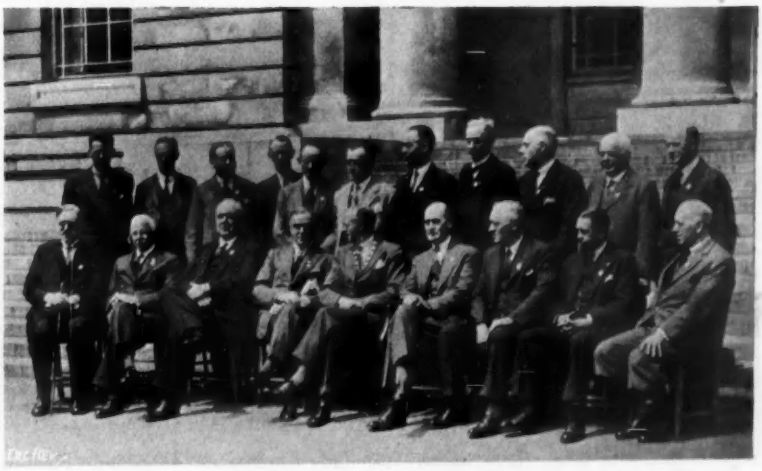
Delegates were guests of Cardiff Corporation at the Civic Week Exhibition which was extended for the Convention. The most notable stand was that of Messrs. Haslam & Stretton, who exhibited a range of "Creda" cookers, water heaters, and various other domestic apparatus, "Lumiflex," and Chloride battery lamps.

On the stand of John Williams & Co., steel window frames were being "fabricated" by the "Murex" welding process, and near-by Hoover, Ltd., displayed vacuum cleaners. James Howell & Co., Ltd., in addition to furniture, exhibited cookers, wash boilers, and other domestic apparatus by various well-known makers. Ozonair, Ltd., demonstrated their air purification equipment, and the Moreland Electric Welding Co., Ltd., a steam pipe for 300 lb. per sq. in. welded on the Kjellberg system, which employs steel electrodes.

Everhot Electric Co., Ltd., showed a number of models of a combined cooking unit and refrigerator; on the stand of Kinshott, Ltd., were "Columbia" and "H.M.V." radio-gramophones and "Murphy" receiving sets, while Bevan & Co., Ltd., included in a display of household effects several "Goblin" vacuum cleaners. Cardiff Corporation Electricity Department made an excellent showing with cookers of various makes, water-heaters, clocks and other domestic apparatus. Well-produced pamphlets, including E.D.A. literature, were available for the householder.

Showroom and Window Displays

A walk round the town also revealed much of electrical interest. In the windows of the Corporation showrooms, "Tricity" cookers and "Magnet" water-heaters were prominent; other makes of cookers are hired out on request. The interior of the shop was well stocked with various makes of



Members of the Executive Council

Back row (left to right): Ald. R. S. Chatfield, Mr. E. J. Nichols, Ald. H. B. Vorley, Mr. J. F. Simpson, Ald. A. E. Gough, Mr. J. Mould, Mr. D. McDougall, Mr. F. Newey, Mr. A. J. Hutchinson, Mr. A. W. Blake and Major E. A. Barker. Front row: Ald. E. Huntsman, Mr. R. W. L. Phillips, Mr. P. J. Robinson, Mr. A. J. Fuller, Mr. C. G. Morley New, Mr. G. Porter, Mr. E. E. Hoadley and Mr. C. J. Wood

all types of apparatus. The G.E.C. showrooms are also a permanent feature; they were supplemented for the occasion by two additional windows. The lectures and cookery demonstrations given all day were well attended, particularly those relating to the thermal storage cooker and agricultural electrification. The Jackson Electric Stove Co., Ltd., has local showrooms adjoining C. L. Wood & Co., promoters of the "all-electric house," but its most interesting display was to be found in one of the windows of R. E. Jones, Ltd., the caterers, where cakes were being baked and kept hot by Jackson equipment.

A reference to the showrooms of Credenda Conduits, Ltd., which were opened by Mrs. Morley New last week, appeared in our issue of June 17th. They will be available, free of charge, to local women's institutes for lectures and functions with a view to inculcating the electrical idea. The local business is to be managed by Messrs. Haslam & Stretton, advantage being taken of the firm's well-established local connection. A. Reyrolle & Co., Ltd., exhibited vacuum cleaners in a corner of these rooms. The British Electric Transformer Co., Ltd., and the Revo Electric Co., Ltd., also took the opportunity to make good displays of their cookers and other domestic apparatus.

Temporary exhibits in shop windows of Mazda lamps and refrigerators were arranged by the B.T.-H. Co., and water-heaters and "circ-stats" by Santon. Among the local retailers who competed for the shop-window display award (in connection with Civic Week) we noticed especially Lighting Accessories, Ltd., James Howell & Co., Ltd., and David Morgan, Ltd., all with domestic appliances of different well-known makes, and Godfrey & Co., Ltd., and J. F. Paull (wireless dealers).

Our impression of the Convention in retrospect is that, in spite of the difficulties under which it was organised, due to the prevailing desire for economy, it adequately maintained the standard set up in the past. This we attribute very largely to the engaging personality of the president, Mr. C. G. Morley New, the unobtrusive efficiency of the hon. secretary, Mr. W. C. P. Tapper, and the willing service given by the secretary, Mr. J. W. Simpson, to the needs of the delegates. To have obtained a record attendance of over 350 at the annual dinner, notwithstanding the smaller total number of delegates, was a notable achievement.

Discussions on the Conference Papers

REPORTS of the presidential address and of the papers entitled "The Organisation and Development of the Small Electricity Undertaking" by Mr. F. Newey, and "Public Lighting by Electricity" by W. J. Jones and J. N. Waite appeared in our last issue.

The Small Electricity Undertaking

During the discussion on Mr. Newey's paper Mr. T. Hall (Burton-on-Trent) emphasised the importance of keeping consumers revenue-earning. He supplied lamps free of charge to his 8,500 assisted-wiring consumers, to counteract the possibility of empty lampholders.

Councillor T. W. Smith (chairman, Long Eaton) said that 1,750 out of 4,600 consumers in Long Eaton had hire-purchase installations and over 70 per cent. of the houses were connected. He attributed part of the increase of 130 per cent. in the undertaking's output in five years to its showroom. They had abolished meter rents, but possibly it would have been better to have reduced charges instead.

Messrs. G. Porter, C. G. Morley New and F. Hodges with a group of South Wales engineers

Mr. M. S. Mason (Worksop) thought that the E.L.M.A. and B.E.A.M.A. schemes for lamp renewals and exhibitions, respectively, did not meet the circumstances in small towns. Mr. A. W. Blake (Willesden) objected to the author's suggestion that the manager should notify the borough accountant of consumers in arrears, as it was the manager's duty to deal with these. He favoured "one-man committees."

The Civic Welcome to the delegates

Mr. W. A. Walker (Kettering) disagreed with the view that installation work should come under the meter department. He advocated the employment of registered contractors only. Mr. F. Price White (Bangor) referred to the present low price of copper. The economic life of mains was much longer than the twenty-five years officially allowed for repayment. A change from d.c. to a.c. would often be undertaken more readily if the repayment period was increased from the five or seven years now permitted.

Mr. C. J. Wood (Sale) said that the smallest conductors for house services should be 0.2 sq. in. Four-wire services were unnecessary; he had single-phase services for 20 kW installed and kept within the voltage variation limits. Ald. Chatfield (chairman, Eastbourne) advocated standardisation of policy for developing small electricity supply undertakings which would be agreed to by all and gone ahead with.

Mr. Newey, in a brief reply, said that a 0.01 sq. in. service would deal with a load of 6.8 kW, which was sufficient for the size of house dealt with in his paper.

Electric Street Lighting

The Thursday afternoon discussion on public lighting was opened by Mr. P. J. Robinson (Liverpool), who objected to the setting up of "John Citizen" as the final arbiter of a street lighting system, which depended largely on its wearing qualities and not on its appearance to the casual observer. The true test of adequacy was not candle-power but visibility; for this there had been hitherto no standard, but a member of his own staff had designed an ingenious method of ascertaining this value.

The ratio of maximum to minimum visibility was a test of uniformity and, to some extent, of economy. He considered that diagonal span wires of staggered lamps gave a greater uniformity than did the ordinary span system as used on the Victoria Embankment.

With the load factors obtained when a large proportion of lamps was extinguished at midnight, the cost of electricity, ascertained by the Electricity Commissioners' formula, was about 1.1d. per kWh. Street lighting was an on-peak load with little diversity, but some slight allowance must be made for advertising. After-hour shop illumination should be encouraged by low rates, as it materially helped the surface illumination of the roads and paths and had advertising value.

Within ten years the number of electric street lamps in Liverpool had increased from 1,786 to 11,213. When conversion from gas was carried out in Liverpool, spacing had been reduced to an average of 45 yards. A sudden change in lighting intensity between a main thoroughfare and the confluent side streets was dangerous. Electricity required far less attention than gas, and was the only system which permitted the adoption of span suspension without great difficulties. One lamp of the two in each lantern in the centre of Liverpool was controlled by the "Radiovisor" system; with that half the lighting would be switched on automatically

Some of the leading figures at the Cardiff Convention

1. Messrs. W. J. Jones and C. W. Sully and Major H. Bell. 2. Mrs. J. J. Hollyer, Mr. J. Taylor, Mrs. Cooke, Mr. Dowson (E.D.A.), and Mr. J. J. Hollyer. 3. Messrs. F. A. Bond and Ll. B. Atkinson and Councillor C. S. Cooper. 4. Mr. Frank Hodges, Ald. H. B. Vorley and Mr. J. Mould. 5. The reception: Ald. A. E. Gough, the Lady Mayoress, the Lord Mayor, Mr. and Mrs. C. G. Morley New, Miss E. D. New and Dr. W. Phillips. 6. Ald. W. Walker and Capt. J. M. Donaldson. 7. Mr. H. C. Lamb. 8. Ald. A. E. Gough, Mr. Morley New and Mr. W. C. P. Tapper. 9. Mr. A. Nichols Moore, Mrs. J. Christie, Mr. W. J. Hamilton Porter, Mrs. Nichols Moore and Mr. J. Christie. 10. Mr. J. H. Rothwell (hon. solicitor). 11. Mr. C. O. Milton. 12. Mrs. Morley New, Miss C. Haslett and members of the E.A.W. 13. Mr. V. W. Dale. 14. Messrs. J. F. Simpson and A. J. Fuller

when conditions required. The others were controlled by clockwork mechanism.

The Price of Energy

Ald. W. Walker said that the number of electric street lamps in Manchester had increased in ten years from 640 to 6,340. The average price of 0.81d. per kWh obtained was profitable. The useful hours of lighting per annum were much greater with electricity than with gas owing to the time taken in getting the whole of the gas lamps alight and extinguished.

He understood that luminous tubes were being developed which would give 200 instead of 18 lumens per watt, in which case charges should in future be based on light and not on kWh supplied.

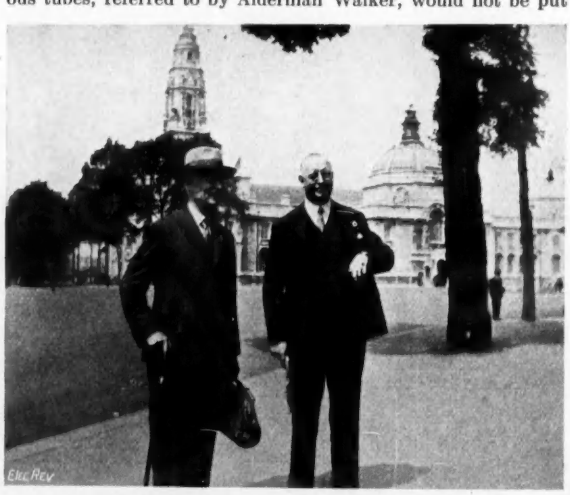
Mr. E. J. Jennings said that in Birmingham they were up against tradition, due to the part played by a very distinguished citizen in acquiring the gas undertaking for the municipality, and tariffs, due to an old statute which fixed the price of gas for street lighting at 1s. 1d. per 1,000 cu. ft. Progress with electric street lighting had only been possible by keeping supply of current and maintenance (at an inclusive price) in the hands of the electricity department. He believed that ¾d. per kWh would be a reasonable charge for it in an industrial area. Independent tests on the rival methods had shown that gas gave a better light immediately under the lamps, but electricity gave a much better result at the mean distances between lamps. During the gales on this two-mile length of road it had been impossible for the gas employés to replace mantles.

Mr. W. N. C. Clinch (Brighton) was in favour of the incorporation of a fifth core as a switch wire in new l.v. mains to control all lamps from one source. He thought that ¾d. per kWh could not be accepted as generally applicable owing to the peak character of the load. He drew the attention of fittings manufacturers to the difficulty of keeping globes clean in coastal towns.

Ald. J. W. Longley (chairman, Bradford) complained that ten years for loan repayment for lamp standards was too low, as twenty to twenty-five years was allowed for the tramway standards. He did not agree that ¾d. per unit could profitably be charged for public lamps. Ald. B. Pearlman (chairman, Hull) said his committee would not be satisfied until all street lighting in Hull was done by electricity. The advertising value of street lighting had been well demonstrated in Hull.

Luminous Tubes

Mr. C. W. Sully (chairman, E.L.M.A.) said that the luminous tubes, referred to by Alderman Walker, would not be put



Mr. Ll. B. Atkinson and Mr. T. R. Martin

on the market until they were efficient and could be made at low enough cost. The E.L.M.A. had approached the I.M.E.A. with regard to an amended life guarantee, as the makers felt that more uniformity in lamp life could be achieved. Discussions would take place with representatives of the industry during the next few weeks on practical methods of obtaining the street lighting of the country.

Councillor H. Coates (chairman, Watford) said that lowness of the cost of electricity for street lighting was limited by the high cost of distribution. Neglect to replace lamps after 1,000 hours life produced some disgraceful examples of street lighting.

Mr. E. E. Hoadley (Maidstone) said that he had obtained 100 per cent. electric lighting by undertaking to give much better lighting for the same money. The average rate charged for street lighting was 0.85d. per kWh, but its advertising value would justify a reduction in the near future. A graduated lighting system had made for safety in the roads.

Mr. W. J. Jones said that the main point of the paper was that sufficient light, intelligently controlled, would provide safety in the streets. Tests at the N.P.L. showed that the gas people's claim that the candle-power of mantles did not fall in service was not justified. Mr. J. N. Waite, also replying, said that ¾d. per kWh was profitable for all night lighting in Hull. At 40 per cent. load factor it represented £4 10s. per kW and ¼d. per kWh.

Proposing a vote of thanks to the authors, Mr. T. Roles (Bradford) expressed the hope that support to the Street Lighting Committee of E.D.A. would be forthcoming on the basis of full subscriptions to that body. Undertakings should also join the Association of Public Lighting Engineers so that the electrical side could be adequately represented in its counsels.

Park floodlighting by the G.E.C.

The Annual Dinner

The annual dinner was held in the Assembly Room of the City Hall on June 16th. Among those present, apart from the speakers, were: Sir Archibald Page (C.E.B.), Capt. J. M. Donaldson (pres. I.E.E.), Mr. Ll. B. Atkinson, Alderman W. Walker, Mr. Arthur Ellis, Mr. A. C. Cramb (E.D.A.), Mr. W. R. Rawlings (pres. E.C.A.), Mr. C. W. Sully (E.L.M.A.), Mr. C. D. Tait (Inc. Assoc. E.P. Cos.), Alderman A. E. Gough (chairman, Cardiff Electricity Committee), Lady Moir (pres. E.A.W.), and Miss C. Haslett (director, E.A.W.).

Proposing the toast of the I.M.E.A., the principal guest, Mr. P. J. Pybus (Minister of Transport) said that the kWh sold in Great Britain in 1931 had increased over the previous year by 3.7 per cent. (4.9 per cent. by local authorities and 1.5 per cent. by companies) to 920 thousand millions. Revenue from sale of energy, after deducting bulk supplies, increased by 2.7 per cent. (3.2 per cent. by local authorities and 2.05 per cent. by companies) to £53.66 million. The effect of industrial depression on the power load was shown by those figures, as it represented 70 per cent. of the companies' total load but only 57 per cent. of that of municipalities.

Mr. Pybus urged those responsible for municipal supply undertakings to scrutinise very carefully all schemes requiring capital expenditure to avoid unnecessary outlay, but at the same time not to take too short a view of future requirements.

Mr. C. G. Morley New (president), responding, said that if all undertakings adopted a progressive distribution policy, no more would be heard of Distribution Boards. Ald. J. A. C. Beaumont (chairman, St. Marylebone Electricity Committee) proposed "The City of Cardiff," to which the Lord Mayor of Cardiff replied. "Our Guests and Ladies" was proposed by Mr. G. Porter (vice-president).

Sir Andrew Duncan (chairman, Central Electricity Board) replied in the absence of Sir John Brooke, whose absence was due to the death of his father. He said that in a year's time the grid would be completed. The Central Board needed the closest collaboration with the supply industry, and within the next few weeks it was intended to set up a committee of engineers of selected stations in each area of the grid scheme with representatives of non-selected stations. A central committee of the whole supply industry would also be called into existence. Those responsible for municipal undertakings should endeavour to dominate the circumstances of their areas.

The Annual General Meeting

The annual general meeting was held on Friday, and the following officers were elected for the coming year: President, Mr. G. Porter (Worthing), an outline of whose career appeared in our last issue; vice-president, Mr. P. J. Robinson (Liverpool); hon. solicitor, Mr. J. H. Rothwell (town clerk, Brighton); hon. treasurer, Maj. E. A. Barker (Barnsley), who succeeds Mr. A. Nichols Moore (Newport, Mon); hon. secretary, Mr. W. C. P. Tapper (Stepney).

Members of Council: Large undertakings, Messrs. A. S. Blackman (Sunderland), F. Forrest (Birmingham), B. Handley (Portsmouth); small undertakings, Mr. J. D. Knight (Ealing); committee members, Ald. W. Emmett (Wakefield) and Ald. J. W. Longley (Bradford).

Next year's meeting place has not yet been settled by the Council, but we understand that invitations have been received from Harrogate and Southport.

The Fire at Lee-on-Solent

Mr. B. Handley's Investigations

LAST Sunday afternoon the pavilion and concert hall on the Lee-on-Solent pier was destroyed by fire and the chief London newspapers all with one consent began to express opinions regarding the cause.

The Times correspondent said that the outbreak was "ascribed to the fusing of an electric cable in the kitchen beneath the refreshment room"; but he also credited visitors who were fishing on the end of the pier at the time with "having noticed an electric cable begin to glow, and then flames spring up all round it accompanied by dense volumes of smoke." *Ascribed*, by whom?

The *Daily Telegraph* guardedly remarked: "Owing, it is thought, to the fusing of electric wires." *Thought*, by whom?

The *Morning Post* credited the head waitress at the restaurant with saying: "When I heard the cry of fire I turned off the electric light"; therefore, be it noted, the supply was available in the restaurant after the fire was in progress, whatever was happening in "the kitchen beneath the refreshment room."

A Sound Installation

On Monday morning we got into touch with Mr. B. Handley, borough electrical engineer of Portsmouth, from whose undertaking the pier supply is obtained, with the object of ascertaining promptly the real facts so far as is practicable after a structure of this, or indeed any other kind, has been completely destroyed. We publish his statement below.

From Mr. Handley's investigations it appears that there is no reason whatever to believe that the fire was *electrical in origin*, that is, due to anything wrong with any part of the installation. It appears that the outbreak did start where two electric cables were cleated together under the decking of the pier, but in the space between deck boards paper and other inflammable refuse accumulates ready for the always dangerous cigarette-end or lighted match to set it ablaze. This seems to be the most likely cause of this particular fire, though the presence of gas-heated urns has also to be remembered, for one report states that the outbreak began with an explosion.

We are indebted to Mr. Handley for the trouble that he has taken in the matter, but satisfactory as the result of his investigation is, we hope that the matter will not be allowed to rest where it is. Of course the fire insurance company or companies are holding their own private enquiry; the information gathered together by them regarding this and other fires would, we believe, be extremely enlightening and valuable. It is most important in everybody's interest that the facts shall be made known; only the truth can help to prevent future catastrophes.

We have on several occasions expressed the view that among the valuable services that can be rendered to the industry by a more active Electrical Development Association is the systematic following up of all published statements concerning so-called electrical fires and, when justified, their prompt denial. If this cannot always be managed in the correspondence columns of the newspapers there is always the certainty that an advertisement by E.D.A. might be made to broadcast the truth quite effectively. It would cost money but would it not be a good investment on the part of the industry?

Electrical men are always ready to profit by experience, and their cause has nothing to gain from a hush-hush policy. Emphatic statements from authoritative quarters proving to the Press and the public alike that electricity is not responsible for half the things for which it is blamed would do a great deal of good.

Mr. Handley's Statement

Referring to your telephone message of yesterday my assistant spent yesterday afternoon in making investigations, and there appears to be no doubt that the fire originated just at the point where two flat c.t.s. twin cables were cleated under the decking of the pier.

These cables supplied some deck standards, but at the time were switched off by a single-pole switch upon a phase side of the system.

The woodwork of the pier was very dry, and must have been practically a non-conductor, so even if the cable had been damaged a leakage to earth is precluded. On the other hand a leakage between phase wire and neutral is also impossible on account of the circuit being switched off.

An obvious explanation might be given by assuming that the cables cleated under the deck held up a quantity of inflammable dirt between the planks. A match or cigarette end would do the rest.

B. HANDLEY, *Engineer and Manager*,
Portsmouth Electricity Department.

Some Driving Forces in the Industry: Eversheds & Vignoles, Ltd.

1, Mr. G. P. Rolfe (*R. Burow*), development manager; 2, Lt.-Col. W. A. Vignoles (*G. C. Beresford*), joint managing director and secretary; 3, J. C. Needham (*Elliott and Fry*), manager, Naval Department; 4, Mr. F. C. Knowles (*Dora Head*), sales manager; 5, Mr. A. Vines (*Rotogravure*), joint managing director; 6, Mr. F. R. Martin (*R. Burow*), works manager; 7, Mr. W. Short (*Elliott and Fry*), chief draughtsman; 8, Mr. C. E. Perry (*C. and M. Wilkinson*), Megger Testing Set Department; 9, Mr. C. Midworth (*Elliott and Fry*); 10, Mr. A. G. Moore (*Elliott and Fry*), Naval Test Room

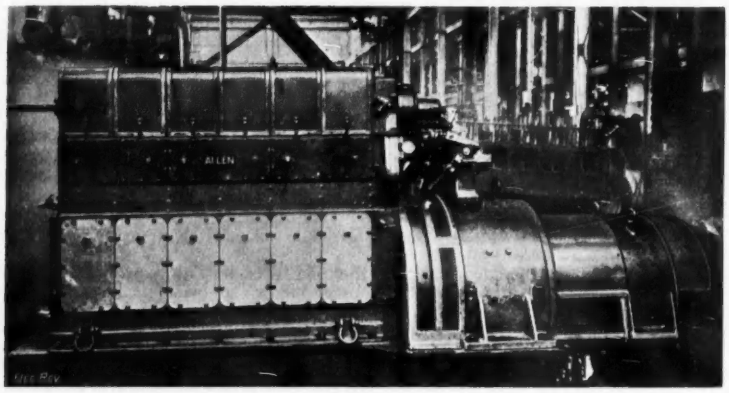
Oil-engine Developments

Low fuel consumption of oil-electric shunting locomotives

THE progress which is being made in the design and application of oil engines was evidenced this week during a Press visit to the Queen's Engineering Works, Bedford, of Messrs. W. H. Allen, Sons & Co., Ltd.

Three oil-electric locomotives constructed in this country for heavy shunting service at the Ford Motor Company's new Dagenham works are being equipped with oil engines designed and constructed by the company. The engines are six-cylinder, four-stroke cycle, trunk-piston units, with airless fuel injection, and the normal rating is 150 b.h.p., at 550 r.p.m.

This new type of engine can be supplied to run at from 500 r.p.m. upwards, according to the size and power, and it is built in 2-, 3-, 4-, 5-, 6- and 8-cylinder units, covering powers from 50 b.h.p. upwards in one engine. Because of the necessity for lightness, the usual cast-iron construction has been dispensed with, and all the main structural parts are of fabricated steel. The welded connections of the various parts are so arranged that the welded sections roughly double that of the parts joined, and therefore have to carry half the specific stress.



Six-cylinder 150-b.h.p., 550-r.p.m. locomotive oil engine directly coupled to a generator

Welded Construction

In the welding process of the steel plates, each plate is closed by a piece of metal which is afterwards removed. The whole frame is so designed that the forces transmitting the combustion load from the cylinder heads to the bearings do not set up tension in any of the main welded parts. The frame plates resemble, from the stressing point of view, a crane hook of I section, calculated so that it is in itself sufficiently strong to carry entirely the maximum gas loads. The cylinders are pitched close together, and the main crankshaft bearings are of ample diameter, but short in length, thus reducing the so-called elastic length of the shaft and effecting a valuable saving in engine length, besides providing much greater torsional stiffness.

At the flywheel end of the engine is fixed the chain drive for the camshaft and other auxiliaries. The use of one chain for driving the camshaft and all other auxiliaries has proved to give excellent results, and there is no possibility of the engine getting out of control and damage being done should the chain break.

The camshaft runs in bearings which are part of the C plate frame, and the fuel pumps are mounted on the same top plate as that which supports the cylinders. The whole of the valve and push-rod gear is enclosed in a case and is easily accessible. The centrifugal governor has one main central governor spring. The spring load can be varied over a wide range, so as to give the driver the choice of running the generating plant from idling speed upwards, all speeds being under the control of the governor. Lubrication is under pressure throughout the engine, including the camshaft, chain drive, &c. The system is provided with an oil cooler of ample proportions and with a dual filter arrangement.

In operation, the locomotive engine is highly efficient, both the fuel and lubricating oil consumptions being exceptionally low, the former not exceeding 0.39 lb. per b.h.p. hour at full load and the latter 0.007 lb. per b.h.p. per hour at full load.

Although comparatively little has been done in this country in oil rail-traction work, the company has entered the field with a prime mover of such design as can be adopted for all types of locomotives, and although the particular engines instanced above are in connection with oil-electric locomotives, it is not solely for this type of drive that the engines are suited. The question of the driving of the oil engine through clutches and gears is one which has and is receiving a considerable amount of attention. Due to the flexibility of the engine and the extreme simplicity of its control it is particularly suitable for the latter type of drive.

Trawler Propulsion

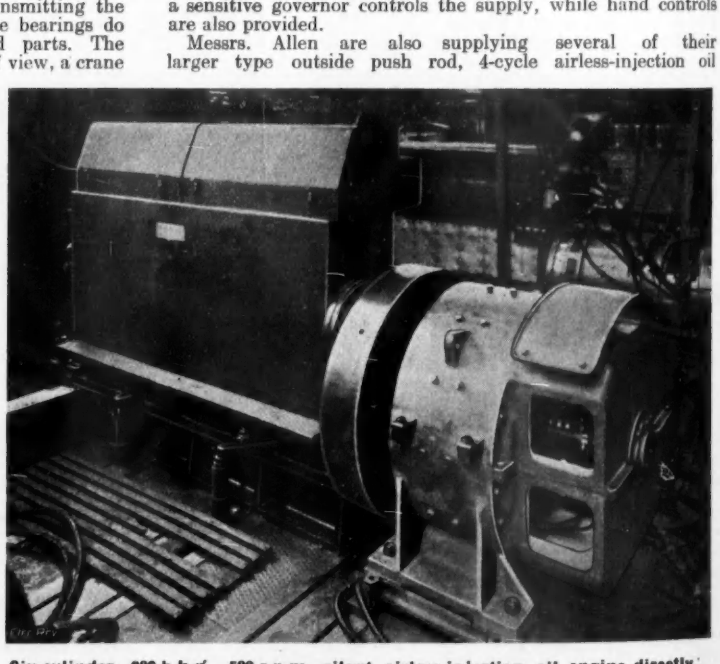
The company has also just completed the main propulsion engine for the fishing trawler *Dusky Queen*, which was originally built as a sailing boat and has now been made suitable for fishing service. It is a 3-cylinder, four-stroke cycle, airless-injection engine, and develops 100 b.h.p. at 500 r.p.m. The cylinder is 230 mm. in diameter, at a 300 mm. stroke. The trawler has an overall length of 65 ft. and a beam of 17 ft.

The layout of the engine room necessitated a great deal of thought in order to arrive at the best arrangement for installing the 100-b.h.p. oil engine. Finally it was decided to place the engine directly under the large hatch, this arrangement enabling the engine to be got into the boat and allowing for overhauling. In order to arrive at a favourable distribution of load, the reverse gear is situated much further aft and connected to the engine through an intermediate shaft. The coupling on this intermediate shaft is formed into a pulley, by means of which the trawl winch on the deck is driven through a belt. The winch has two drums, port and starboard, each being fitted with a dog clutch for disengaging independently.

There are also on order at the present time new oil engines for propelling four large coal barges to be put into commission in Egypt. Other interesting developments of the company include three oil engines to be used for the power and lighting requirements of a block of buildings comprising in the main high-class residential flats. They will be situated underneath the surface at the side of a main road, thus calling for very stringent requirements for the prevention of noise and vibration.

A special form of air silencer is provided, and this, together with the careful designing and manufacture of the engines, makes them as quiet in operation as it is possible to ensure. To add to the quiet running of the engines, each has been enclosed by means of an easily removable bonnet which is lined with "mascolite." Full load specific fuel consumption of 0.39 lb. per b.h.p. per hour is obtained and the lubricating oil consumption is 0.0065 lb. per b.h.p. per hour at full load. The fuel pumps are arranged on the separate unit system and a sensitive governor controls the supply, while hand controls are also provided.

Messrs. Allen are also supplying several of their larger type outside push rod, 4-cycle airless-injection oil engines for a number of other interesting installations in connection with water and sewage pumping, factory main driving, &c. With these larger and lower speed engines, the fuel consumption at full load is notably low, being 0.38 lb. per b.h.p. hour, while the lubricating oil consumption is 0.004 lb. per b.h.p. hour at full load.



Six-cylinder, 200-b.h.p., 500-r.p.m. silent airless-injection oil engine directly coupled to a 133-kW dynamo for land power application

At luncheon Mr. R. W. Allen, chairman of the company, made a plea for consideration of the possibilities of electricity generation by the oil engine in outlying districts where it would not be economical to deal with the load by supplies from the grid. He also strongly deprecated suggestions for lowering the standard of British workmanship as a means of dealing with foreign competition.

Battery-propelled Vehicles. By H. C. Harris, A.M.I.E.E.

Their sphere of usefulness and working costs

FOR town work with frequent stoppages the battery-propelled vehicle compares very favourably with any other type. The necessity for recharging precludes its use for long-distance work, but, when employed in delivering goods or in dust collection, it rarely covers more than 30 miles per day, which can be run fully loaded on a single charge; certain makes will cover twice this distance.

A three-ton vehicle requires approximately one kWh per mile run. The total running cost, including tax, licence, depreciation, renewals, labour, etc., with electricity at ¾d. per kWh, is about 11d. per mile, while the cost for petrol and steam vehicles of the same size would be about 11¾d. and 1s. 2¾d. per mile respectively. The energy consumed varies with the tyres used and the surfaces of the roads upon which they are employed.

Surface.	Resistance in lb. per ton at 10 m.p.h.	
	Solid Tyres.	Pneumatic Tyres.
Asphalt	23	29
Macadam	26.5	33.3
Tar macadam	26.2	33
Wood blocks	24.6	31
Granite blocks	46	58
Melting snow	47.5	59.6

The values given in the table must be increased considerably if the road surface is wet. In England the taxation on electric vehicles is much less than on petrol and steam vehicles, and insurance rates are lower, owing to absence of fire risk. The upkeep costs are low, as there are no shocks during starting and running and no reciprocating parts to cause vibration; the life of the vehicle is prolonged for these reasons.

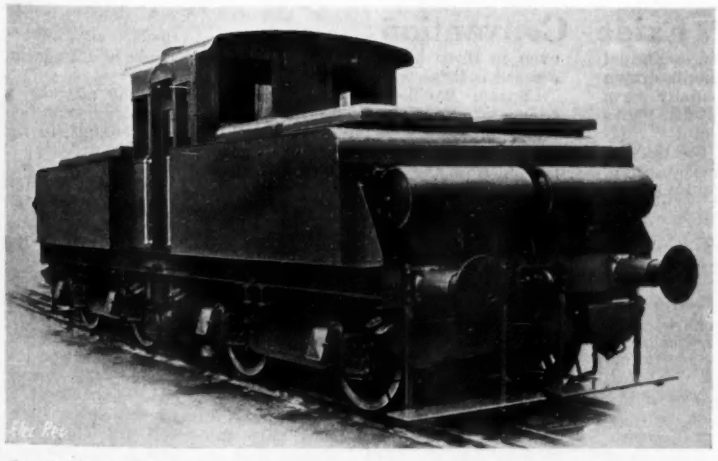
Regenerative control in hilly districts enables an appreciable amount of energy to be re-stored in the battery. The absence of petrol fumes, smoke, and noise are of very great advantage in towns, while, for purposes where very frequent stops of short duration are required, such as refuse collecting, great saving is effected by shutting down the motor.

Performance of Cells

Both acid and alkaline cells are in use, the life of the latter being about six to eight years—between two and three times that of the former—but its initial cost is more than double, its watt-hour efficiency is only 80 per cent. as much and, unless always charged at its full rate, its capacity falls considerably.

Its robustness, lightness, and the absence of corrosive acid are very great points in its favour, and if the initial cost were reduced it would be, without question, the more suitable for use in battery vehicles.

With present prices, lead cells give the better results if a skilled maintenance service is available, otherwise the initial cost of alkaline cells is soon saved by the freedom from running time lost due to battery failure. It is the usual practice to employ an e.m.f. of between 70 and 90 V. One kWh is required for a journey of 8 to 10 ton miles. Thus a lorry whose overall weight is 5 tons requires a battery of $35 \times 5/10 = 17.5$ kWh capacity to enable it to cover 35 miles on one charge.



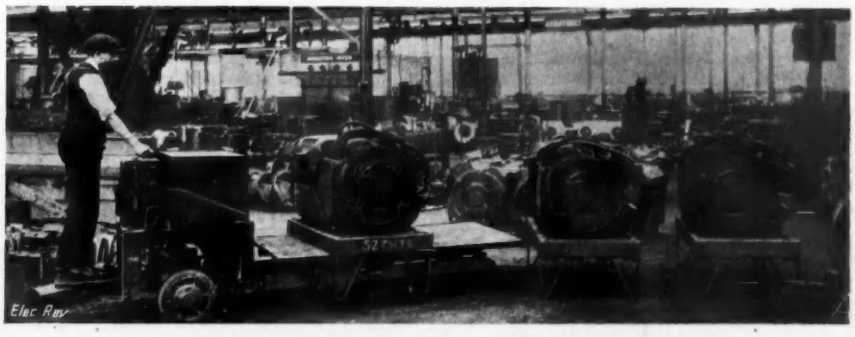
An English Electric battery locomotive used on the B.B. & C.I. Rly., India

The cells are usually grouped together in several bitumen-filled crates in various parts of the vehicle, but this method is not very satisfactory, owing to the inaccessibility of the individual cells. A more suitable arrangement would be to carry the cells in two battery boxes, one on each side of the vehicle, wooden or rubber packing being used between the cells—a method advocated by Mr. Marshall in his book, "Electric Vehicles."

Mr. H. C. Harris was assistant electrical engineer to the Bombay, Baroda, and Central India Railway until a short time ago

Charging is carried out while the lorry is off duty by means of a charging plug in the garage. A charge at night is usually sufficient, but where a greater mileage is required a boosting charge is carried out during the lunch hour. An equalising charge is required about once a month; this consists of a long charge at a very low rate, and is necessary because individual cells become charged in unequal amounts, due to the slight differences which exist in the characteristics of all cells.

The number of driving motors varies according to the carrying capacity of the lorry, those for heavy duty generally having one motor to each wheel. They are series wound, except where there is regenerative braking, when compound wound motors are necessary. Series-parallel control is employed, varying the battery voltage, the number of motors in series, and the field strength. Owing to the necessity of obtaining as long a run as possible per charge, solid tyres are frequently used in preference to pneumatic ones. Comparatively soft solid tyres are the most suitable. Although hard tyres have less road resistance, they cause excessive wear, due to vibration, unless the road surfaces are very smooth.



An elevating truck and stillages in a traction motor repair shop

Industrial Trucks

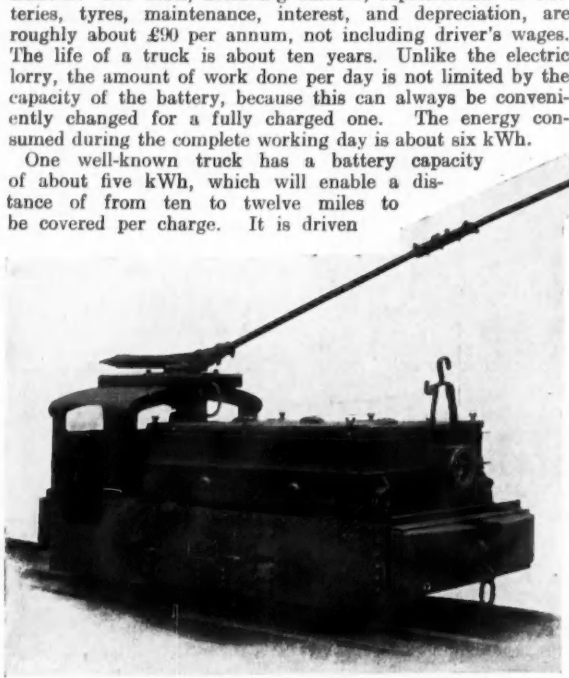
For factory use the battery truck is much more satisfactory than any other method of moving material, except where very heavy loads are concerned. They often render overhead travelling cranes unnecessary, and hence buildings may be of lighter and consequently cheaper construction. Further advantages over travelling cranes are that materials can be moved to and from any position where there is room for the truck to travel, and no loading and unloading is necessary when removing from one building to another. Furthermore, repairs and maintenance can be carried out conveniently and safely at floor level, whereas cranes present difficulties in this respect.

A great improvement has been the addition of an electrically operated lifting platform which enables the truck to receive and discharge its load in a few seconds, thus allowing it to be kept running all day. The goods to be moved are placed on loose stillages, which can conveniently and quickly be picked up at the loading point and deposited where required. One truck will operate a large number of stillages, one hundred per truck, under certain conditions, being not unusual. One elevating truck will do the

work of three or four fixed platform trucks, and is much more adaptable.

Efficiently operated trucks should save an annual amount of not less than their initial cost, and sometimes even twice this amount. The costs, including current, replacements of batteries, tyres, maintenance, interest, and depreciation, are roughly about £90 per annum, not including driver's wages. The life of a truck is about ten years. Unlike the electric lorry, the amount of work done per day is not limited by the capacity of the battery, because this can always be conveniently changed for a fully charged one. The energy consumed during the complete working day is about six kWh.

One well-known truck has a battery capacity of about five kWh, which will enable a distance of from ten to twelve miles to be covered per charge. It is driven by two 1-h.p. series-wound motors, one geared to each of the driving wheels, thus rendering a differential unnecessary. The controller is operated by a foot pedal, which cannot be depressed until the reversing lever has been moved from the "off" position, thus preventing inadvertent starting. A gradient of 1 in 10 can be negotiated under full load.



A combined trolley and battery locomotive (English Electric Co.)

Battery locomotives can be used with advantage when an overhead contact wire or a third rail is impracticable, as in mines. Alternatively, a contact wire may be provided over certain portions of the track, the locomotive being provided with a trolley and a change-over switch for dual operation. When employed in a goods marshalling yard, it renders an expensive and complicated contact system unnecessary, and reduces noise very considerably—an important point when local residents have to be considered. In such a case also provision may be made for running the locomotive from a conductor rail or overhead contact wire.

The battery-driven locomotive is essentially the same as the ordinary electric locomotive, with the addition of a "charge and discharge" switch, charging sockets, a voltmeter, and an ampere-hour meter. It is generally not practicable to provide batteries of over 250 V, owing to their weight. Both lead and alkaline cells give satisfaction. A 30-ton locomotive carries a battery of about 165 kWh capacity. Those carried by the smaller sizes of locomotive are generally light enough to be easily removable for charging, either by steel lifting straps passing under the container and terminating in eyes for the accommodation of lifting tackle, or by grooved wheels on the container which run on transverse rails on the locomotive frame and enable the container to be run off on to a charging stand.

Under good conditions of shunting and marshalling a steam locomotive uses power for only about 30 per cent. of its working period, and burns coal and stores heat inefficiently during the remainder. Furthermore, all stored heat is wasted at the end of the working period. The battery locomotive has no standby losses, and requires very little time to prepare for duty. The time required for overhaul is about one-seventh of that required for a steam locomotive. The Diesel-electric locomotive is the only type that can compare favourably with the battery locomotive for shunting purposes. It has, however, the disadvantage of noise, fire risks, and fumes.

Acknowledgments for the illustrations are due to the English Electric Co., Ltd., and Messrs. Ransomes, Sims & Jefferies, Ltd.

An industrial truck negotiating an incline of one in seven

The Exide Convention

LAST week the Chloride Electrical Storage Co. held its annual Convention at Blackpool, and for four days agents drawn from all parts of the country and delegates from many parts of the world, discussed matters of internal policy, such topics as "Equipment and How to Make the Best Use of It" (following a paper by Mr. J. E. Odgear, manager of the London Service Depôt), "How I Would Like to See a Service Station Run" (by Mr. Grinnell S. Harvey), "Sales Getting by Advertising" (Mr. H. Boon), and "Newspaper Advertising" (Col. Wilkinson).

In connection with the convention there was a display of service equipment and a demonstration of service and charging benches; also a publicity exhibit arranged by Mr. R. H. Jackson, including specimens of national and local advertising matter, posters, display cards, signs, leaflets, photographs, &c. A competition was also held on themes connected with sales-getting and the reduction of overhead costs.

In the "Exide" golf challenge cup competition, which was played on the St. Annes' golf course, the winner was Mr. G. P. S. Evans (handicap 18), who returned a net score of 65. Members of the company's staff also took part in a competition for a tankard presented by the service agents. This was won by Dr. R. E. Lane, whose net score was 77.

Mr. D. P. Dunne, managing director, at the opening of the convention, said that the turnover in every branch of business had increased during the year, whilst sales of the "Drydex" dry battery exceeded all expectations. This had been accomplished by going out after business and demonstrating that even in these hard times, sales could be made and trade increased if there were energy and determination.

Captain Neville Stack and Mr. W. Courtenay attended a convention lunch prior to their parture on a demonstration flight to India; they are carrying "Exide" greetings, in the form of a model battery, to agents on their route. They started from the Blackpool Aerodome on June 15th.

At the convention banquet, which was held in the Baronial Hall at the Winter Gardens, Mr. D. P. Dunne, who presided, said that the development of the storage battery was a matter of electrical engineering, and its uses in the service of the public for motor cars, radio, and other purposes, were innumerable. Even the man in the street was now keenly interested in the performance, life and quality of the batteries on which he had to depend, whereas ten years ago he had no particular concern about such considerations. "Exide" had 600 service agents in this country, and 13,000 in the world.

The Mayor of Blackpool replied to the toast of "The Municipality," and Mr. H. B. Schofield proposed "Our Guests," to which Mr. A. E. Moody (Radio Manufacturers' Association) replied. Mr. G. S. Harvey gave the toast of "The Exide Service Agents," which was replied to by Mr. S. S. Dawes.

On Thursday, Mr. E. C. McKinnon read a technical paper, which was followed by a paper by Mr. C. M. Mills, and by "A Pertinent Discussion" between Mr. Roland Winder and Mr. L. A. Darby. Following the conclusion of the business proceedings of the convention and the closing address by Mr. D. P. Dunne, the party toured the Lake District.

A Gypsum Mine

All-electric winning and working

THE gypsum works at Gotham, Derby, of the Gotham Co., Ltd., may justifiably be described as an all-electric job, for, apart from the initial blasting, the only non-electrical power used is compressed air for rock breaking, and even this is supplied by electrically driven equipment.

There are two distinct branches of the business. One is the supply of raw or uncalcined gypsum in pieces of about 2-in. cube size, as used in the cement trade, and as a finely ground material for stone dusting in collieries, and for fertilising. Better qualities of the ground substance are sold as

Rock being hauled from the mine

loaders and fillers to the textile and paper industries. The other branch provides for the manufacture of plaster of Paris and Keene's and Parian cements.

The rock is found at a depth of 80 yards, and it is won by mining operations through a drift (mine entrance) in the hillside. At a number of working faces the material is released by blasting and picking, and after an initial grading in the mine it is conveyed by horses and trucks to the terminus of a main and tail haulage system, the winding gear of which, driven by a 30-h.p. motor, is outside the mine. The distance from the winder to the terminus is about 900 yards, and the steepest incline is about one in twenty. Up to 14 tons per journey can be dealt with by the haulage gear.

Breaking and Crushing

On arrival at the works the stone, after weighing, is broken up to workable sizes by pneumatic picks supplied by a compressor driven by a 30-h.p. motor. The common qualities are delivered to the crushing plant, the better qualities being taken to the dressing shed for further grading. A 40-h.p. motor serves the initial jaw crusher, which will deal with 20 tons of rock per hour, reducing it to about 5-in. pieces.

From this crusher the gypsum is elevated to a picking belt, upon which the better qualities are sorted, and delivered into two 30-in. granulators which reduce the stone to from about 1½-in. cube to powder. These granulators are driven jointly by a 65-h.p. motor, and each crushes about 10 tons per hour.

A bucket elevator with 76-ft. centres delivers the crushed stone from the granulators to the top of the mill, some 60 ft. above ground. A considerable portion of the poor-quality material is delivered into a revolving-drum screen; this and the 76-ft. elevator have a common 20-h.p. drive.

Fines from the rotary screen are further elevated for delivery to a vibrator screen which produces fine material for making common quality plaster or for sale direct as raw gypsum.

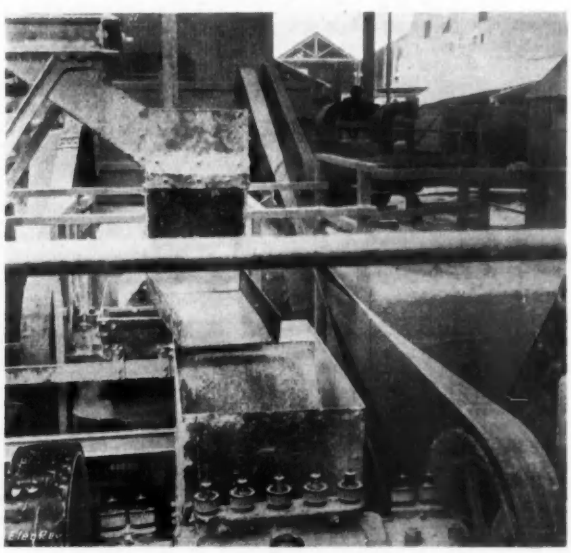
The main elevator from the granulators also delivers the crushed stone of various qualities into storage bins ready for the mills. There are several mills, each consisting of a pair of 5-ft. diameter stones; the bed stone is fixed and the upper one revolves. The capacity of each pair of mills is from one to two tons per hour.

The Mill Drive

Driving the whole of the mills is a 125-h.p. motor, the installation of which, with the gearing, presented some formidable difficulties, but the result is a creditable piece of engineering (see illustration). This motor is directly coupled to a helical reduction gear supplied by the Northern Manufacturing Co., Ltd., and the drive is thence by "Vee" ropes on to the layshafts of the mill.

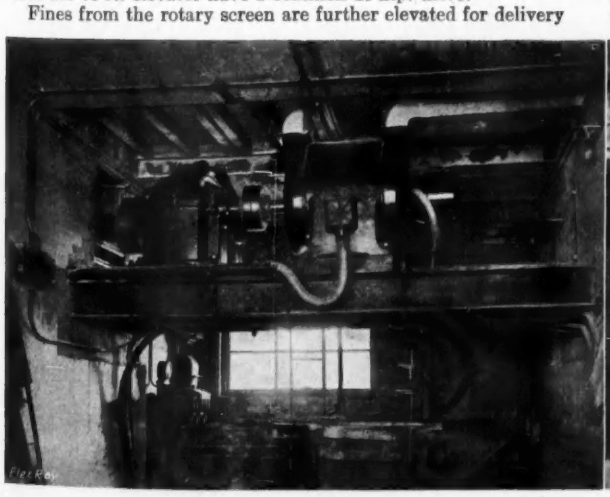
If the material required is raw gypsum it is sacked off direct from the mill stones, but if it is required for plaster or cement it is taken by worm conveyors to plaster houses and delivered into storage bins immediately over the kilns.

Gypsum contains about 20 per cent. of loosely combined water. Plaster of Paris is made by reducing this water content to about 6 per cent. This is done in shallow circular kilns, each of which calcines from one to two tons of gypsum per charge. During calcination the ground stone is kept in motion by slow stirring gear, a 7½-h.p. motor serving two kilns for this purpose. The drive for the kilns represents a very large speed reduction—12 r.p.m. at the layshaft. The motor is coupled direct to worm reduction gear, and from this to the layshaft the drive is by chain and pinion.

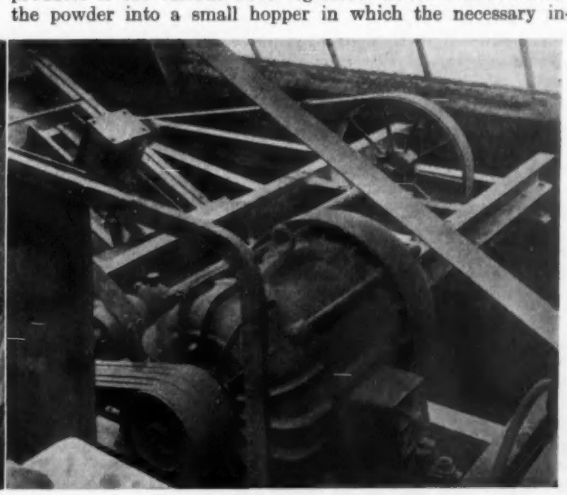


The main crusher and elevator

The company's special brands of wall plaster are "Gothite" and "Thistle," and for these the calcined material is elevated into storage bins serving economic mixers which mix the products of the various kilns together. These mixers deliver the powder into a small hopper in which the necessary in-



The 125-h.p. mill motor and gearing



Vibrator screen at the mill top

gredients are added, and which serves a further mixing machine from which the finished material is bagged up direct.

For the manufacture of Keene's and Parian cements calcination is conducted on "slip" kilns which are fired at a much higher temperature than those used for plaster. For driving the mixing machines there are various motors of from 5 to 10 h.p.

Miscellaneous uses of electricity throughout the works include drives for a forced-draught fan for the kilns; a cleaning machine for twill bags; a "Singer" sewing machine for sack mending; and a special machine for making "Guelph" casks for packing cement for export. These casks are cylindrical and of two-ply wood bound outside by wood and iron hoops. The motor revolves the casks on an expanding metal drum, and drives two circular saws for trimming the ends.

Something like 350 h.p. of motors is installed, the units varying in size from ¼ to 125 h.p. The majority are Brook machines, while some were supplied by Crompton Parkinson; the English Electric name plate was observed on the winder motor. The larger motors are slip-ring machines with short-circuiting gear, because of the heavy starting torque, and the smaller ones are all squirrel cage. Many of the motors are of the enclosed ventilated type, because of the conditions in which they operate. Nearly all the starters are of Ellison manufacture.

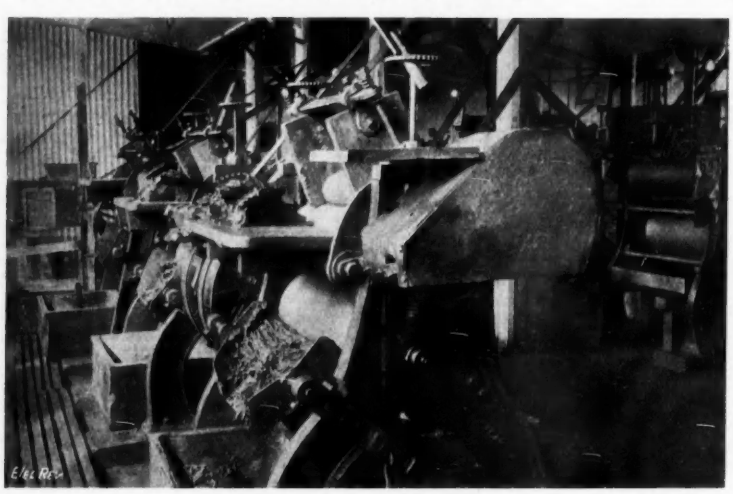
The mills run continuously, night and day, thereby presenting a fair load factor. All the motors are supplied at 440 V,

Looking down into one of the kilns

at which pressure supply is taken from the Derbyshire and Nottinghamshire Electric Power Co., although an overhead line delivers to the site at 11,000 V.

Pencil Making

ONE of the best examples that we have seen of how high-speed mass production is rendered possible by the electric drive is in connection with pencil making, a little about the processes of which we learned recently during a visit to the Garden Pencil Works, Stapleford, Nottinghamshire, of Messrs. F. Chambers & Co., Ltd. While several thousand gross of pencils are produced in this factory per week, the total h.p. installed is only about 100 h.p.



A group of lead milling machines

The modern pencil is made by mixing certain special clays with the graphite, the first process being milling or grinding. This is usually done in machines with triple granite rolls, the middle one also having an oscillating longitudinal movement. After grinding, each batch of the mixture is subjected to various processes to ensure uniformity, in preparation for the next operation, extruding, to form the slip. This is effected on electrically driven hydraulic presses, the lead being passed through special dies.

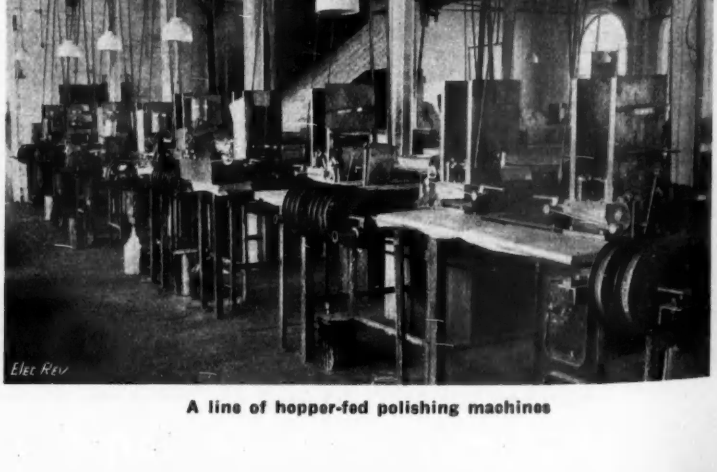
The drying of the slips is the next essential operation. For this they are laid in grooved boards to ensure their drying perfectly straight. The slips become fairly brittle during this process, at the end of which they are fired in kilns, when the water is driven off, and the material becomes quite set and hard. The lead is then ready for introduction to the wood.

Seasoned cedar wood in the form of slats is passed through a grooving machine which planes the wood to a definite thickness, at the same time cutting the grooves to the sizes of the slips which they are to receive; six grooves are made in a slat. The grooved slats are next coated with glue, after which the slips are laid in the grooves of one slat and a second similar slat is laid on the top. The pairs of glued slats, with their slips, are next clamped tightly in small groups and left for several days.

The units thus prepared are next made into pencils proper in shaping machines. In a double-shaping machine with a hopper feed the glued board passes over cutters revolving at a very high speed, and automatically returns under the same cutters, the shaped portions, pencils, being separated in the process. A double-shaping machine is capable of producing about 200 gross of pencils per day.

The finishing operations before examination and packing for despatch include sandpapering, polishing, stamping, and pointing where necessary. In a sandpapering machine which will deal with about 120 pencils per minute, the pencils are held, while revolving, against sandpaper. Polishing involves the passage of the pencils horizontally through baths of finishing materials such as paint, cellulose, &c., according to requirements. The machines are hopper fed, and one will treat about a gross of pencils per minute. On pointing machines one girl handles regularly over 1,000 gross of pencils per week.

The lead and wood shops, which house the grinding, milling, extruding, shaping and sandpapering machines, &c., are responsible for the major consumption of electricity, the whole of this plant being served by 52 h.p. of motors. A 15-h.p. motor drives the polishing, pointing, paring and stamping machines. Auxiliary and minor drives include a 3-h.p. motor in the paint-making shop, and a 2-h.p. motor in the slip-cleaning (after ingesting) department. Simple belt drives are employed throughout.



A line of hopper-fed polishing machines

The Ferranti Jubilee

The origin and growth of the company

WHEN Dr. S. Z. de Ferranti passed away about two-and-a-half years ago he left a vacancy in the electrical world that still remains unfilled.

As a man of vision and leadership he held amongst us a quite unique position. He had no sudden rise to fame, but from his early years he concentrated his genius largely upon the invention and practical use of means for advancing the production and distribution of electricity. His confidence in the brilliant future that lay before us in the utilisation of electricity in the general service of mankind will never be forgotten. His optimism was nothing less than a commanding call to the whole industry to believe in itself and to avail itself of its wonderful opportunity. May we not fittingly use the Ferranti Jubilee celebrations of this week to sound the call again?

We published so admirable a record of Ferranti's inventions and interests, from the pen of Mr. L. B. Atkinson, in this journal on January 24th, 1930, that it is not necessary to describe them now. The jubilee that is being celebrated is that of the establishment of the business bearing the well-known name. The volumes of the ELECTRICAL REVIEW for the year 1882 contain many leading and descriptive articles regarding the new dynamo-electric machine that was then introduced jointly by Sir William Thomson (Lord Kelvin) and Mr. Ferranti.

The First Ferranti Company

In our issue of September 23rd, 1882, we published the particulars of the registration on September 15th of the company, Ferranti, Thompson & Ince, Ltd., with a capital of £240,000 in £5 shares and with offices at 110, Cannon Street, E.C. The signatories were: S. Z. de Ferranti, A. Thompson, Francis Ince, F. A. Holman, J. W. Temple, and Robert Hammond. The solicitors were Ingledew, Ince & Co.

In the following issue we said that both inventors of the machine mentioned above, worked out their ideas independently, but in the one patent there was something which was wanting in the other. "Therefore, to be more completely successful, the patentees have combined their efforts with the result of effecting—so it is said—a revolution in such machines." "It remains to be seen," we added, "to what degree of perfection the cheap production of electricity has arrived by means of this invention, but it appears certain that a great step is about to be attained and that by its means the ultimate success of electric lighting will be much enhanced."

Later in the same year (December 2nd, 1882) in publishing a fully illustrated description of the Ferranti alternating current machine, we said: "On Monday evening last a large number of gentlemen connected with the Press and others scientifically interested in electric lighting met in the Cannon Street Station Arches . . . . for the purpose of publicly inspecting the Ferranti machine." And further: "We wish the inventors and the Hammond Company which is responsible for the introduction of the machine, every success with the future development of this most simple, compact, and efficient apparatus; and we shall be much surprised if the present dullness pervading the whole of the electric lighting business be not greatly brightened, and the prospects of lighting by incandescence in particular enormously advanced by the introduction of the Ferranti dynamo-electric machine."

We limit ourselves to these quotations, but they will serve to bring before the reader a picture of developments which were proceeding when the company began its operations.

Turning, it may seem abruptly, from that starting point to the company now so well known as Ferranti Limited, we find that from its very small beginnings it has so widened the scope and character of its activities that it has become a British electrical manufacturing company with works right up to date in their organisation and equipment and employing some 5,000 workpeople at Hollinwood. Portraits of the company's personnel were published in our issue of May 6th last. Growth and development are still proceeding, and in connection with the jubilee there is now being held in London, at Bush House, an exhibition of manufactures which are seen by visitors to Hollinwood. This is one of the small features of the celebrations and it is felt to be a fitting means of bringing some of the items of interest from Hollinwood to London for the convenience of friends of the company.

The late Dr. S. Z. de Ferranti

A luncheon was held in London on Monday last in connection with the exhibition. Mr. V. Z. de Ferranti (chairman), who presided, pointed out that the firm had known its "ups and downs" and it was consequently not so fearful of the prevailing state of affairs as some concerns which were experiencing adversity for the first time.

The Exhibition

It is instructive to note the significant change which has taken place gradually in the character of the company's products, from the heavier power plant to lighter apparatus for domestic purposes. This aspect of Ferranti's activities is well illustrated by the exhibition where a small machinery section has been arranged to demonstrate pivot hardening and burnishing machines, micrometer jewel examination, and other apparatus.

A rotating meter testing set with a number of new F.4. and F.4.P. types of a.c. ordinary and prepayment meters is functioning under working conditions, and a range of prepayment, polyphase, two-rate, and switchboard a.c. and d.c. meters forms an interesting contrast to the very earliest models of Ferranti meters, some of which have only recently been

The meter display

The electric fire and clock section of the exhibition

taken from service, though they were still giving satisfaction.

It is obviously impracticable to attempt to portray the striking developments which have taken place in the design of large power transformers in a display of this sort, but a representative collection of the smaller products of the transformer department include surge absorbers and testing sets, a 132-kV oil-filled bushing, a grid on-load tapping switch, "Bakelite" tubes, safe load indicators, a mercury switch voltage regulator, and an X-ray transformer, while the "S.V.10" transformer which is largely used for radio work represents the smallest made in this department.

In the measurement section there are not only potential and current transformers and relays, but also a complete range of indicating instruments from the 2.5-in. to 10-in. dial models, the accuracy and soundness of construction of the smaller instruments being emphasised by subjecting them to various tests. There is also a sample of the grid metering panels supplied to the Central Electricity Board.

Clocks and Radio Sets

The manufacture of synchronous electric clocks is one of the most recent departures of the company. A comprehensive range of "Bakelite," wood, and metal-cased timepieces is available both for the home and factory in various colours and styles. These clocks are really beautifully made, several component parts displaying considerable ingenuity of design, and it is not perhaps generally appreciated that ordinary clocks of comparable accuracy are unobtainable for less than about six times the price of electric clocks.

One model of particular interest is shown behind a glass panel which is so lighted from above as not only to illuminate the dial and hands, but also an advertising panel below.

The *pièce de résistance* of the exhibition is the new seven-valve superheterodyne band-pass console broadcast radio receiver. It is compact, simple to operate, and soundly constructed to meet to-day's not too easy reception conditions. A mains-energised moving coil loudspeaker is incorporated in the set, which is very good value at its price, the ganged condensers and other parts being substantially made and rigid assembly assisted by welding.

The company's well-known range of radio components includes audio-frequency and mains transformers, condensers, chokes, battery eliminators, and speakers, samples of all of which are on view, besides an amplifier of the type used in kinemas and dance halls.

Domestic Appliances

In the display of domestic equipment, prominence is given to water heaters and fires, of the latter there being now two distinct styles which have been christened "Era" and "Modera." The latter fire has been developed for those who have not the space available for the accommodation of the rather larger "Era" fires and who desire a lighter and more portable type.

An interesting extension of the use of the "Era" fire has recently been its adaptation for the heating of chicken brooders. The radiant heat produced by this fire has been found to be very beneficial and, as a result of the long-distance effect of the rays emitted, it has become possible to make the brooder in a very much more hygienic form than usual.

The exhibition is to remain open until July 2nd, and a large attendance of visitors is anticipated.

New Books

Theory of Machines. By Louis Toft and A. T. J. Kersey. Pp. ix+408; figs. 272. London: Sir Isaac Pitman and Sons, Ltd. Price 12s. 6d.

This book provides a good elementary course in the theory of machines. The first part is devoted to fundamental principles; the treatment is clear and concise and it is good to see that the time-honoured "parallelograms of forces and velocities" have been displaced by the more general "parallelograms of vectors." It is a pity, however, that it still appears to be necessary to "define" the mass of a body as the quantity of matter in the body. The analogies between linear and rotational dynamics are clearly brought out, and this should do much to reduce the difficulties usually experienced by the beginner in the study of rotational motion.

The remainder of the book deals with simple machines, valve gears, straight line mechanism, lubrication, drives, gearing, &c. There is also an appendix on dimensions which illustrates the use of dimensional equations in testing for errors in formulæ, and a useful summary of the formulæ dealt with in the test is given. A set of examples (with answers) is provided at the end of each chapter. The book contains about 350 examples in all, many of them being taken from papers set by the University of London and the Institution of Civil Engineers. The standard of mathematics required involves a knowledge of simple differentiation and integration and elementary differential equations. The typography and figures are excellent.

This book was written primarily to supply the needs of university students in the subject of theory of machines, and it should fulfil its purpose admirably. From the point of view of the electrical engineer, and on account of the increasing importance of electrical machines, it would have been preferable if more examples and illustrations could have been included from the domain of electrical engineering. Nevertheless, the book is one which might be studied with profit by most electrical engineers.

Wiring Systems. By L. M. WATERHOUSE. Pp. 172; illustrated. London: Gee & Co., Ltd. Price 3s. 6d. and 5s.

The opening statement that "The distribution of electrical energy in buildings has undergone considerable development since the days when the metal filament lamp made its appearance" might lead readers to expect that suggestions and advice or at least descriptions of modern three-phase wiring distribution would be dealt with; especially as this aspect of indoor wiring has a new importance in these days of rural electrification when supply companies insist on the balancing of loads as low as 3 kW. The author, however, barely touches on the many problems relating to main, sub-main and circuit layout.

The handbook arrangement is unusual in that it is not divided into chapters. The page headings, however, are well arranged and varied to classify the text, and the author is to be congratulated on the simple device of collecting these headlines at the end of the book to form the index. Another unusual and practical feature is a directory of the names and addresses of manufacturers whose products are mentioned. Eight pages of squared paper for notes, &c., are included and a removable transparent "cable card" is provided which can be placed over circles representing conduit sizes and which shows their capacity for V.I.R. cables. A substantial portion of the book is occupied with details of steel conduits and their accessories; as the author has been chairman of the Conduit and Fittings Panel of the B.S.I., his treatment of this section is of special value.

In treating of the varied wiring systems a skilful selection has been made of illustrations and descriptions of the available modern joint boxes and accessories. A page is devoted to power circuits for domestic appliances, and some hints are given which will be helpful to intending consumers in estimating the approximate consumption of typical electrical appliances.

The book should serve as an interesting introduction to the subject of modern wiring practice and presents a comprehensive and illustrated survey of the materials and systems now readily available in this country.

Rewinding Data for Direct-current Armatures. By G. A. VAN BRUNT and A. C. ROE. Pp. 212; figs. 176. London: McGraw-Hill Publishing Co., Ltd.

This book will be of service to those who repair and rewind d.c. armatures; it is instructional rather than educational. Great stress is laid on the taking and recording of correct and ample data to ensure that the rewound machine will function properly.

Throughout the book much explanatory matter on the characteristic types of windings is given. Some of this information will be strange to English readers, as also will be some of the American terms such as "frog-leg" windings. On the other hand, the indication of so much repair work—as evidenced by the large number of cases dealt with—comes rather as a surprise to people here, who are so often told that American practice is to replace or renew.

In addition to information on rewinding, cutting-out coils, &c., other matters such as insulation, banding, baking, &c., are dealt with. We think that if all special or unusual cases were deleted from the book, together with much explanatory matter, the work would be handier and more useful as a service manual.

* * *

Shorter Notices

"Electric Supply Undertakings of Australia." A Supplement to Tait's Electrical Directory. Melbourne: Tait Publishing Co. Price 2s. 6d.—The book gives details of the supply at all towns in Australia with name of the supply authority, type of plant, capacity, distribution system, and number of consumers.

"Wireless Receivers." By C. W. Oatley. Pp. 103; figs. 41. London: Methuen & Co. Price 2s. 6d.

"The Mystery of Electricity," by M. P. Paul. London, W.1. "The Rally." Price 1s. 3d. A legendary retrospect and prophecy of the "electricity-god" which ends by warning us that "The misused god of electricity will turn upon the tyrants that enslaved it and with one awful gesture obliterate mankind."

"Geschichtstafeln der Elektrotechnik." Pp. 127; figs. 67; 5 diagrams. Berlin: Charlottenburg; V.D.E.: Verlagsabteilung. Price Rm.6.—The period covered by this "history of electrotechnics" is 1881-1931, the book having been written for the jubilee of the Elektrotechnische Gesellschaft of Frankfurt.

"Electrical Manufacture," edited by Philip Kemp. Vol. 1: Pp. viii+256; figs. 47. Vol. 2: Pp. viii+252; figs. 36. Price 6s. each volume. London: Sir Isaac Pitman & Sons, Ltd.

"The American Electricians' Handbook," by T. Croft. Pp. 1,051; illus. London: McGraw-Hill Publishing Co. Price 24s.—To this third edition over 200 pages have been added, including 150 new illustrations.

"Rewinding and Connecting Alternating-Current Motors," by Braymer & Roe. Pp. 372; figs. 228. London: McGraw-Hill Publishing Co., Ltd. Price 21s.

Electricity on the Poultry Farm. By G. T. Church

Its advantages with suitable apparatus

THE poultry load should be of considerable value to the supply undertaking, as it is constant day and night for, in most cases, about six months of the year. On farms where chickens are reared for the table, electricity is in use practically all the year round. The chief advantages of electricity to the farmer are: great saving in labour; low running costs; pure air in incubator and brooder rooms; reduced fire risks and lower insurance premium; reliability in all weathers; regularity of temperature; and saving in space.

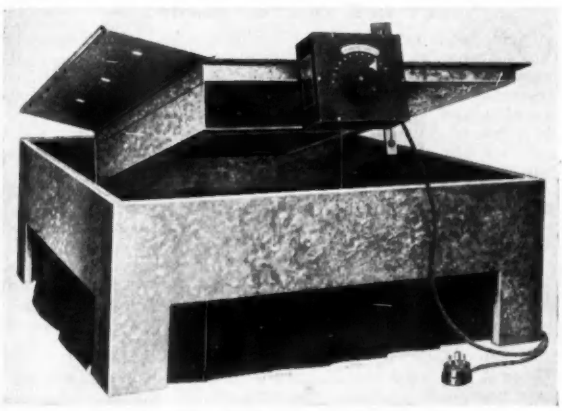
Incubator Heating

The practice of slipping heating elements into an existing incubator flue, the current being controlled by contacts placed under or attached to the capsule rod of the incubator, has the disadvantage that such contacts are slow in action; they are also likely to become dirty, so that the circuit is not made and the incubator cools, or else to become welded together, which results in the eggs becoming cooked. Moreover the temperature continues to fall after contact has been made until the elements heat up, or to rise after the contact has been broken, due to residual heat.

In one well-known make of heater, which can be attached to an existing incubator, these disadvantages are overcome by the use of tapped elements connected to a double-armed selector switch. The contact under the capsule rod makes one of the selecting arms alive, thus regulating the temperature. As the circuit is not broken there is no trouble from dirty contacts.

Incubator room temperatures should be kept constant, with a view to overcoming the trouble from hatching moisture due to the varying amount of air which passes through the ventilator holes, so that when the correct amount of moisture to be added has been ascertained it need not be altered.

The testing of eggs for fertility with a powerful electric lamp enables the work to be done very quickly and at an early date. Such a lamp can also be used at different times during the incubation period for inspecting the eggs to test their



A 150-chick electrically heated brooder

evaporisation and to discover whether the amount of moisture in the incubator is correct.

Electric Brooders

There are two types of electric brooders, one warmed by lamps and the other by hot plates. The former is cheap, but suffers from the following drawbacks, from which a properly designed hot-plate system is immune: (1) the chicks do not get a proper rest as the brooder is always lighted; (2) heat regulation is not easy; (3) lamps are liable to break, when the brooders are being cleaned or moved; and (4) the heat is patchy and the chicks huddle together under the lamps.

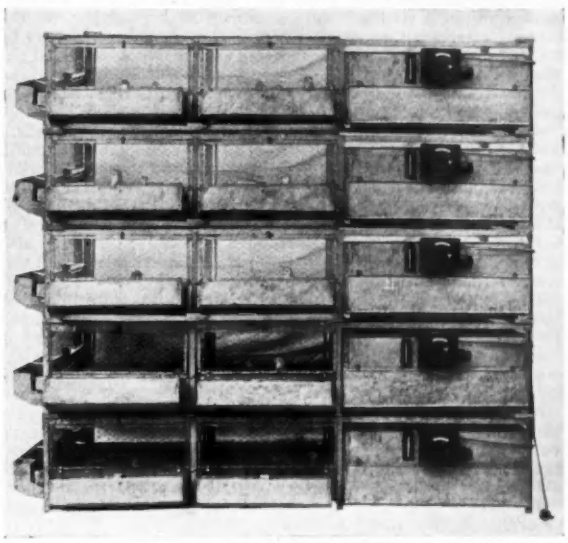
With automatic heat control, the regulator may be upset when the brooders are cleaned or during inspection of the chicks, and it has to be varied as the birds grow. The best form of control for practical purposes is to vary the temperature in stages of three or four degrees by means of a multiple selector switch.

The brooder illustrated measures 2 ft. 6 in. by 2 ft. 6in., and has a capacity for 150 chicks. The heater is fitted with a 12-way control and an off position; the current consumption may be varied from 0.1 up to 1.5 amp. The energy used is about 0.5 kWh per chick during the six weeks comprising the brooding season.

The heater used in the "battery" brooder illustrated is similar to the foregoing, but the maximum loading is 1.2 amp. and the energy consumption about 0.4 kWh per chick. Each deck of the battery is a complete unit.

Lighting the Laying House

The lighting of the laying houses produces more eggs in the winter when prices are high. The best system is to lengthen the day artificially at both ends and to use dimmers to raise and lower the lights gradually; a six-action clock switch



A battery of brooders

is made for the purpose. The lighting of brooder and growers' houses can be performed in the same way, giving a longer feeding day in the winter.

In cold weather the birds do not normally drink enough water to maintain the egg supply, but this can be corrected by the use of a 15-W water warmer with an automatic switch to operate between certain temperature limits. Other uses of electricity are for egg graders, egg washers, food mixers, ultra-violet rays, plucking machines, and constant hot water.

Wiring

Wiring should be carried out with lead-sheathed cable or v.i.r. cable carried on porcelain cleats. Between the different buildings v.i.r. cable can be run overhead, and supported by porcelain insulators or cleats fixed to posts fastened to the sides of the houses. The best type of plug is the three-pin switch-plug without a switch knob; this is fool-proof.

Electric heating compares favourably with any other means up to 1.5d. per kWh, but if all the attendant advantages are taken into account its adoption would be profitable at a much higher figure. Recently a number of electric brooders were installed on a large poultry farm, and the services of two men, who were required previously to look after the oil-heated brooders, were dispensed with.

Even if no public supply is available it would still pay the farmer to use electricity generated by a small oil-engine set. The saving in labour and other advantages would very soon repay the cost of installation.

The new premises of Messrs. Johnson & Phillips (Pty.), Ltd., Locano House, Johannesburg

Legal

IN the King's Bench Division during last week Mr. Justice Lawrence continued the hearing of the evidence for the defence in the action by the Radiovisor (Foreign and Colonial), Ltd., against Radiovisor Parent, Ltd., claiming £200,000 damages and the return or cancellation of 120,000 £1 shares on the ground of alleged misrepresentation in the sale to the plaintiffs of the foreign rights in a selenium light bridge. Defendants denied that there had been any misrepresentation.

Mr. C. Allen, public lighting superintendent for the Borough of Hampstead, said the first "Radiovisor" unit was installed at Hampstead in May, 1929, and experiments gave good results. Mr. C. S. Davidson, engineer and manager of the Barnes electricity undertaking, said that in the early part of 1928 "Radiovisor" street lighting units were installed in certain streets in Barnes and in his view the method was far more satisfactory than hand control. The units had since been extended to about a mile and a half of streets.

Mr. J. W. Avern, managing director of the Parent Co., gave evidence. He denied that he ever told Mr. Terrell, managing director of the plaintiff company, that the Parent Co. was a going concern. Replying to Sir William Jowitt, K.C., for the plaintiff company, witness said the working of the Barnes units satisfied him that the degree of constancy was sufficient to bring about successful working. But he also agreed that they were improved. He knew that it had been alleged that the bridges in the demonstration were adjusted each day before a demonstration, because they were taken off the current. He did not believe that the bridge as it existed in 1928 was ready for "mass production," and in his view it was not a mass production job. He was of opinion that without any further experiments the bridge could be useful, and commercially produced in large quantities. Witness agreed with the statement that had been made that in 1931 only three bridges were returned on account of altered characteristics. Others had been returned on account of mechanical faults. He had no reason to doubt the statement of the defendants' statistical department that up to the end of April, 1932, 1,334 bridges were in operation and that there was no case of bridge failure owing to altered characteristics.

Sir William proceeded to deal with a number of complaints which had been received from lighting engineers with regard to the bridge, when his Lordship observed that there was nothing to convince him in this that all the engineers were completely dissatisfied. Sir William replied that the statement was made in the prospectus of the Parent Co. that the bridge was constant in resistance. But they found that right up to the date there were still troubles arising from the commercial working of the bridge despite improvements that were said to have been made.

Mr. Avern further stated that he never told Mr. Terrell, of the plaintiff company, that 10,000 bridges had been manufactured by the Parent Co. Re-examined, witness said that eighteen bridges were returned to the Parent Co. because of the alteration of characteristics in 1930 out of 782 issued, three in 1931 out of 1,215 issued, and none up to the end of April, 1932.

Lt.-Col. the Hon. A. C. Murray, chairman of the Radiovisor Parent Co., said he was completely satisfied with the prospectus of the Parent Co. in the form in which it was passed in 1928. He did not agree that the history of the bridge had been a long series of complaints and rejections.

The hearing is proceeding.

A Telephone Installation Dispute

Sheriff Hamilton has issued his decision in an action in Paisley Sheriff Court at the instance of The New System Private Telephones (Scotland), Ltd., Glasgow, against William Paton, Ltd., boot and shoe lace manufacturers, Johnstone, for payment of a year's rental in advance for a private telephone installation. The principal basis of the action was a contract dated September 5th, 1919, with a duration of twenty-one years, but modified by a clause in the following terms: "Should the installation prove unsatisfactory to the subscriber this contract may be terminated by giving six months' notice in writing." The subscribers gave notice on May 27th, 1931, terminating the contract, but the plaintiffs declined to accept the notice and commenced proceedings.

His Lordship sustains the first plea in law for the respondents and dismisses the action. He says the respondents admit the contract, but further explains "that the respondents, having found the telephone installation unsatisfactory in many respects, gave notice on May 27th, 1931, to the plaintiffs cancelling the contract as empowered by said clause." As the plaintiffs made no proper reply to this averment they must be taken as admitting it in point of fact. But if this be admitted, then the contract had admittedly come to an end before the instalment sued for fell due, provided always that the respondents could terminate it on their simple expression of dissatisfaction.

The plaintiffs agreed that the clause was to be regarded as part of the contract, but they maintained that in it the word "installation" referred solely to the setting up in the respondents' premises of the apparatus hired by them, and that the clause referred only to dissatisfaction with this initial operation. His Lordship could not accept that construction. He observed that the plaintiffs' principal obligation is to supply a "telephone installation." It was evident that the word "installation" referred to the apparatus to be supplied, and he could find no reason for construing it differently in the subsequent clause. Apart from that there was nothing to limit the application of the clause in point of time. It therefore appeared to him that the clause meant that if, during the duration of the contract, the subscriber should be dissatisfied with the telephone installation the contract might be terminated. His Lordship therefore held that the contract was terminated as at November 27th, 1931.

South London Electric Supply Corporation Sued

Mr. Justice Swift and a common jury on June 17th heard an action by Wm. Henry Young (19), an infant, suing through his father, Mr. Arthur Albert Young, Ingleton Street, Brixton, against the South London Electric Supply Corporation, Ltd., claiming damages for personal injuries. On July 8th, 1931, plaintiff was riding a motor cycle along Brixton Road, near Normandy Road, when he tripped over an obstruction in the road, caused, it was alleged, through the wooden blocks not having been properly replaced after excavation work by defendants.

The defence was that it was an inevitable accident, that plaintiff should have seen the obstruction, if any, and there was contributory negligence.

Plaintiff, giving evidence, said that he felt a violent bump, his machine was thrown out of control, and a tyre burst. He sustained a fractured wrist and bruises. Cross-examined, witness denied that he was "hugging" the tram lines, which, defence alleged, contributed to the accident.

A representative of the company said that he had inspected the road after the job was finished. He considered it to be a perfect reinstatement. The jury returned a verdict for plaintiff for £100, and judgment was given accordingly, with costs.

Contal Radio, Ltd.

In the Companies Court on Monday Mr. Justice Eve had again before him the petition for the compulsory winding up of Contal Radio, Ltd.

Counsel stated that a scheme was being prepared in this case, and his Lordship directed the matter to stand over for a week.

Parliamentary

(BY OUR SPECIAL REPORTER)

ON June 13th Mr. H. Williams asked the Minister of Transport if he could state the written-down value of the assets of the Surbiton and district undertaking, the original cost of which was £194,000, which were transferred to the London and Home Counties Joint Electricity Authority for the sum of £198,216; and whether there was any other consideration in addition to the cash payment and, if so, what was the nature of that consideration.

Mr. Pybus said that the answer was in the negative. It was not the practice of electricity companies to write down their capital expenditure until such time as particular assets disappeared. In addition to the cash payment, the Joint Authority assumed liability for the balance of certain sums due from the company to the Surbiton Council, amounting to between £2,000 and £3,000 and payable over a period of years.

Wireless Licences

On June 15th, Mr. Graham White, the Assistant Postmaster-General, informed Mr. Raikes that the total receipts from wireless licence fees during the year ended March 31st, 1932, amounted to £2,294,438. Of that sum 10 per cent.—or £229,444—was retained by the Post Office to cover the cost of collection and administration in accordance with the supplemental agreement with the British Broadcasting Corporation, which was laid before Parliament in June, 1931. The payment to the B.B.C., which under the terms of its licence was based on the wireless licence revenue of the previous year, amounted to £1,225,709.

Fatalities

An inquest was held recently at Fishburn, Co. Durham, on James Edward Lockhead (27), who was killed in the garret of his home while erecting an indoor wireless aerial. Mr. E. T. Roberts, assistant district engineer to the Cleveland Electric Supply Co., Ltd., said he was called to Lockhead's house and found in his left hand an electric lamp attached to a wire, his right hand gripping a tubing conveying electric wires along the rafters. The lampholder was incorrectly wired, and it had evidently been done by an inexperienced person. There was a small strand of copper wire in contact with the metal cap, and deceased would have a firm hold of the cap and holder that carried the lamp. While walking about the rafters he would not experience a shock, but it was the theory of witness that Lockhead slipped off one of the beams and in falling grasped hold of the tubing to save the lamp. He would then receive the full force of 250 V. A formal verdict was returned.

George Mitchell, 103, Foulford Road, Cowdenbeath, Fife, who was employed by the Fife Coal Co., as a labourer, received a fatal electric shock while following his employment at No. 7 Colliery sub-station, Cowdenbeath, on June 14th.

Correspondence

Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession

Switch Safety

In a letter on this subject which appeared in last week's issue of the ELECTRICAL REVIEW, Mr. E. O. Catford repairs the omission of two text books in giving a rule for ascertaining whether the switches of a completed installation are directly connected to the live pole of a system.

Mr. Catford writes: "Switch on the lights, remove the s.p. switch cover, and through a test lamp connect the switch terminal to the nearest earth; if the lamp lights up the switch is connected in the live wire." As a matter of fact the above test in inexperienced hands will give misleading results as the following will show.

If a certain switch and lampholder with a 100-W lamp installed is being tested by the above method, with a 25-W test lamp, the test lamp will light even though the neutral is through the switches. A little reflection will show that the 100-W house lamp and the 25-W test lamp are in series to earth, and, owing to the higher resistance of the test lamp (accentuated by the temperature coefficient of the filament) most of the system voltage will be across the test lamp, which will light with practically full brilliancy while the 100-W lamp will not light.

No doubt Mr. Catford is fully aware of this, but his letter states "switch on the lights," which implies that the lamps are in position.

A good tester would automatically test for the live wire, and a very careful one might, in addition, use a live wire indicator, but he would also take the precaution of removing the house lamp from its holder before testing.

Bedford, *June 18th*, 1932. W. H. STIMSON.

E.H.P. Switchgear

I read with interest the article by Mr. S. Ferguson, in your issue of March 4th last. It is a relief to know that one engineer at least in Great Britain realises what seems to me the rather ridiculous position of those in charge of big electricity supply systems in which high-voltage circuit breakers form part of the equipment. One gathers that circuit breakers have been installed and are being installed with ratings of a million, a million and a half, and even more kVA. One gathers further that the engineers recommending the purchase and installation of those circuit breakers do so in the belief that the circuit breakers so rated will actually rupture circuits of the order of those figures and still remain fit for use as circuit breakers. And yet so far as I know not one of the circuit breakers with those high ratings has ever been tested at its working voltage up to the kVA at which it is rated, or even up to half or in many cases one-tenth of that kVA.

Some years ago it was decided to proceed with a big scheme of distributing electrical energy at 33 kV in the metropolitan area of Sydney. The scheme included the construction and equipment of a big power station. Circuit breakers to operate at 33 kV and 11 kV were purchased from a number of different British firms, and the specifications required that they should have certain ratings in kVA at the working voltage. Shortly after the system was put into operation a number of failures of insulation occurred on underground 33-kV cable of heavy section, but in no case did the calculated kVA ruptured approach the rating at which the circuit breakers were sold. While the circuit breakers did effectively break the short-circuit current in many cases, on several occasions they entirely failed to do so, with disastrous results to the system.

By arrangement with the firms supplying the circuit breakers a series of tests was organised at the power station. Owing to the risk entailed by throwing short circuits on to the plant, the proportion of the generating and transformer plant used in carrying out those tests would give only a limited kVA on short circuits. This series of tests showed what the failure of the circuit breakers in actual commercial use had caused me to fear, that none of them could be relied on to break effectively short-circuit currents of very much less than the kVA at which they were rated by the manufacturers.

The contractors who had supplied the circuit breakers, or some of them, agreed to my suggestion that the design of their circuit breakers should be amended. I desired to have tests made to prove that the circuit breaker as modified would effectively break short circuits of the order in kVA appearing in the original specification. At this stage, however, the contractors and myself came to a full stop. The circuit breakers, in fact, cannot be tested (so I am assured) in Great Britain at even a small fraction of their rating. By sending the modified circuit breaker abroad from Great Britain it is hoped that it may be tested up to approximately two-thirds of its rating. With this test carried out on a British-made circuit breaker in a foreign country I must be satisfied.

If I had not first hand knowledge, I would refuse to believe that circuit breakers were made and sold and used in England as having a rupturing capacity of, say, a million and a half kVA, the designers, manufacturers, sellers and users of which do not know for certain that they will effectively rupture a circuit of 10 per cent. of their rating.

I must say, however, that I have nothing but admiration for the way in which contractors have "stood up to" what is in some cases only a moral obligation. I have much sympathy with the designers and manufacturers who have to put apparatus on the market without being able to prove to themselves by test that the apparatus will actually do what it is sold to do. I condemn those, one of whom is myself, who make up the great body of British engineers, at home and abroad who have not long ago insisted on the effective proving by test that circuit breakers will do what they are intended to do before they are installed. H. R. FORBES MACKAY.

Sydney, *May 4th*, 1932. *General Manager*, Municipal Electricity Department.

The correspondence on this subject seems liable to turn to a competition in vituperation, so perhaps I may be forgiven an effort to keep the peace. Neither the humorous and caustic remarks by "Anon" nor the rejection of all untested switches implied by Mr. Bamber can be regarded as helpful. The purpose of my article was to assist the wavering purchaser to make up his mind amidst the competing claims of manufacturers. Mr. Bamber will agree that to educate the buyer to expect something better and more reliable is in itself a worthy object, and the point at issue between your correspondents is whether this shall be achieved by test or from a consideration of fundamentals in design. Obviously both are essential.

The more a buyer learns of circuit breakers, the more discriminating will he become, so that, eventually, he will reject those designs which are obviously over-rated. Mr. Bamber is concerned to recommend only circuit breakers which have received a certificate of test, which implies that a buyer is expected to accept a test certificate and not to inquire too closely into what is inside.

"Anon" implies that test certificates are being used to frighten engineers into accepting only circuit breakers which have passed certain tests, but looking ahead to the time when all manufacturers will produce test data obtained under identical conditions, the buyer will be in the maze again, and must fall back on design criteria. Unfortunately, both of your correspondents have adopted a partisan attitude instead of working for the common good, and by a play of words have obscured the true purpose of my remarks.

Blackheath, S.E.3, *June 15th*, 1932. H. F. YELLAND

The New I.M.E.A. President

In your short biographical article on Mr. Geoffrey Porter in your current issue you state that this gentleman joined the staff of the Westminster Electric Supply Corporation in *1927* where he "gained much useful experience in every kind of breakdown that an enthusiastic young engineer could desire."

A window of the Cardiff branch of the G.E.C.

May I submit a correction as to this date? To the best of my recollection Mr. Porter was on the staff of the W.E.S.C. from thirty to thirty-three years ago and not five years ago as reported. This correction is rather important as the report suggests that only as recently as five years ago the W.E.S.C. gave a lot of valuable experience in breakdowns to young enthusiastic engineers! About thirty years ago, perhaps, but five years ago, quite definitely, no! S. G. BUDD.

London, S.W.1, *June 18th*, 1932.

[We regret the slip; 1897 is the correct date, of course.—EDS. ELEC. REV.]

Industrial Heating in the Potteries

We have read with interest the article in your issue of June 17th on "Industrial Heating in the Potteries."

We should like to draw your attention to the fact that the Moore Campbell electric tunnel kilns, whilst formerly made by our associated company, Messrs. Gibbons Brothers, Ltd., are now manufactured solely by this company, the personnel

of which is that of the former firm and Wild-Barfield Electric Furnaces, Ltd.

Furthermore, the last paragraph of the article implies that high-temperature kilns for glazing are not yet commercial possibilities. We are pleased to be able to state that we are in a position to offer such equipment, having carried out the necessary experimental work for a considerable period.

G.W.B. ELECTRIC FURNACES, LTD.,
J. E. Oram, *Director*.

London, N.7, *June 18th*, 1932.

The Private Plant

Referring to the article bearing this title in the current issue of the REVIEW, I feel that certain of Mr. Tookey's statements should not be allowed to pass without comment by those interested in the public supply industry. This question is of great importance to every supply undertaking, but here, in Northern Ireland, where small "private plants" have increased like rabbits, due no doubt to the lack of adequate public supplies during a period of progressive and intensive oil engine development, it is of vital importance.

The ultimate success of the scheme of electrical distribution now being carried out in this country, and in other parts of Great Britain, might well depend on the efforts of all concerned in countering such oil engine propaganda as appears in Mr. Tookey's article. For that reason I would venture the following comments.

First of all, it is my opinion, well borne out by experience, that a consumption of fuel oil as low as 0.61 lb. per kWh is seldom, if ever, attained by a small plant working on a commercial basis. Indeed, with a 50-kW set, I venture to describe the prospect of such a figure as fantastic; 0.8 lb. would be a good result for a well-maintained plant of this size. The modern Diesel plant cannot be relied on to give more than fifteen years of economic life, even when installed, run, and maintained under the best conditions, and those conditions are *not* to be found where 50-kW private plants are installed.

In the table of working costs for private plants Mr. Tookey includes a sum of £30 per annum for "sinking fund at 5 per cent. interest." Presumably this is intended to cover the interest on, and repayment of a capital sum of, £1,500 over a period of twenty-five years. Surely the annual payments would be round about £100. If my opinion concerning the life of the plant is well founded it follows that, on the basis of a twenty-five-year loan, the owner will at some time find himself paying for two, and possibly three, plants; alternatively he would be in the bankruptcy court. Of course, in practice this does not occur. After about the fifth year (not fifteenth) the "private owner" goes over to the public supply. Unfortunately there are always new power users to avail themselves of the splendid selling organisation of the oil-engine makers.

Now, to come to the electrical costs, Mr. Tookey does not state the capital involved, but he gives £26 5s. as the annual charge. This would cover an installation costing £300, taking in this case a legitimate life of twenty-five years. The £300 would also cover, shall we say, the installation of twenty 5-h.p. motors. Methinks Mr. Tookey would recommend two 50-kW sets in this case. Why is £100 p.a. charged for repairs and attendance? Even in the case cited above, £20 p.a. would more than cover this item.

There are other points which could be questioned, but space forbids. In conclusion I would voice what must be the opinion of many of my kind, that not for many a long day have we come up against such an enthusiast for the "private plant"; no, not even from the proud possessor of such a plant.

PHILIP E. CLARKE, *Engineer and Manager*,
U.D.C. Electricity Department.

Newry, *June 18th*, 1932.

Copper-clad Steel Conductors

I am wondering if any of my fellow readers who have had practical experience of the performance of small-gauge copper-clad steel conductors erected on e.h.p. overhead lines can help me. From observations which I have recently made on an 11-kV No. 8 s.w.g. line of this material the line vibration, in practically still air, was considerable and, in comparison with either copper or steel-cored aluminium lines, truly alarming. The existence of such vibrations can, of course, be accounted for, but what concerns me is the possibility of the conductor failure at straining and suspension points due either to fatigue or crystallisation of the metal.

To reduce the line tension would, no doubt, greatly lessen this possibility but the resultant increased sag would destroy the chief advantage of this type of conductor. It seems to me that the usual type of terminal clamp and method of "binding in" the conductor on pin-type insulators do not provide for this excessive vibration, particularly in the case of the pin-type insulator where the section resting in the insulator groove is held fairly rigid by the "binder" with the result that the vibrations are damped at this point. No doubt suspension-type insulators would be better from this point of view, but their use, in my opinion, is out of the question for lines of the type referred to.

It may be interesting to readers who have had no experience of this class of conductor to know that I have observed, in a moderate breeze, the vibrations to be so pronounced that, at a point about 18 in. from the pin insulator, the conductor appears a mere blurr about three times its own diameter. Any advice or comments on this subject would be welcomed.

June 20th, 1932. KEENLY INTERESTED.

Poor Pay

The following advertisement caught my eye when reading a local evening paper: "Elec. Imp.: about 12s.: able to plug walls, etc." Surely the industry does not expect that an improver is only capable of plugging walls for the princely salary of 12s. per week—and this after probably five years' apprenticeship. It is hardly encouraging for a lad to enter an industry with such poor prospects as these.

Warrington, *June 19th*, 1932. N. S. BYERS.

Public Address Installations

FOR the eighth year in succession Marconiphone public-address apparatus is to be used at Hendon for the Royal Air Force display on June 25th. Each year the equipment has had to be enlarged, and this time 50 horn-type speakers and four "searchlight" loud speakers are being employed, in addition to the company's amplifier coach, which will be connected to the main control room by land line. For linking up all the speakers several miles of heavy cable will be needed, all of which has to be buried.

The Wallasey swimming pool

Three distinct telephone systems have been provided, one for traffic control, one for flying control, and one for administrative purposes. In emergency intercommunication between all the systems will be possible, and special testing arrangements have been made to enable faults on any pair of lines to be traced quickly. A mobile radio-telegraph station will also be on the aerodrome to collect and distribute weather reports, and to control the movements of aircraft coming from the various stations.

The work entailed in the installation of this system is of a complicated nature. The amount of wire and cable which has to be specially laid for the display each year exceeds eighty miles. All equipment used is lent for the purpose of the display.

The new Wallasey open-air swimming pool, which was opened on June 8th, has been equipped with a public-address system by the Gramophone Co., Ltd., to provide music daily and also assist in directing sports events and gala meetings. The amplifier will serve an area of 50 yd. by 150 yd. with sufficient volume to be of entertainment value and yet not inconvenience people in the immediate vicinity of the loud speakers. The main amplifier is mains operated, and a double turntable gramophone pick-up outfit and Reisz microphone have also been provided. Besides the pre-stage microphone amplifier panel, there are two independent power amplifier units, each having an anode dissipation of 120 W and an undistorted output of 14 W. Each unit is a two-stage amplifier consisting of an M.H.4 Marconi valve transformer coupled to a power stage, which consists of 2 DA.60 valves in parallel, choke capacity coupled to the output transformer.

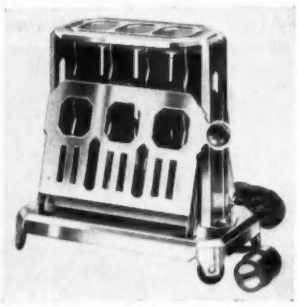
A main distribution board makes the installation flexible and 10-watt loud speakers have been installed in weather-proof teak cases covered with special splash-proof gauze. They are wired on two distinct circuits, so that at least two speakers may always be operated should one of them fail.

New Apparatus and Devices

for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

An Electric Toaster

A toaster is a relatively inexpensive piece of apparatus that can be utilised to make the householder who does not use electricity for domestic purposes electrically minded. Its ability to do the toast actually on the table should have a wide appeal, and should prove its value in backing up the iron. PREMIER ELECTRIC HEATERS, LTD., Keeley Street, Birmingham, are already well known for their toasters, but they are now marketing a smaller and less expensive model in which they have aimed at keeping the same good qualities of materials and workmanship as in their other models. As far as is possible the frame has been pressed out of one piece of metal. When the toaster doors are opened the bottom of the toast is made to slip outward on a curved surface, thus exposing the other side of the toast to the elements. These are loaded at 450 W, which has been found to be almost as efficient as the 600 W of the larger models, and averts burning. The standard model is nickel-plated, although a chromium-plated model is available; it can also be obtained with a switch in the flex, enabling switching to be done on the table. All standard voltages are catered for, and a twelve months' guarantee is given.

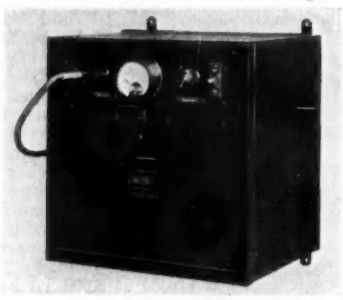


The new "Premier" toaster

Comparing Vibrational Noises

An instrument known as the noise comparator has been designed by STANDARD TELEPHONES & CABLES, LTD., Connaught House, Aldwych, W.C.2, for the purpose of comparing the volumes of vibrational noise emitted by gears. It may also be extended to the testing of vibration emitted by a complete machine, and in certain cases the vibration of the floor of a machine shop.

By listening to the noise emitted by a pair of gears in motion, engineers often judge whether the quality of workmanship is of a sufficiently high standard; but this method is too largely dependent on the human element to give much reliable information. Absolute measurement of noise level is not obtainable by this apparatus, but the noise comparator may be employed to compare the amount of noise generated by a pair of gears of unknown quality with that emitted by another pair of gears previously tested and set up as standard for this purpose. To operate the equipment a 6-V accumulator and a 120- or 130-V dry battery are required.



The noise comparator

A Novel Light-sensitive Cell

Orthodoxy has been entirely discarded in the design of a new type of selenium cell made by the "SÜDDEUTSCHE APPARATEFABRIK G.m.b.H., Nürnberg, Germany. It is claimed for the cell that a current is yielded merely by the application of light and that with a standard element of 10 sq. mm. of surface, a light of 5,000 lux and an external resistance of 300 ohms, a current of 0.5 mA is obtained. It is made in two sizes with an effective surface of 2.8 and 9.7 sq. cm. respectively, and comprises a framed selenium disc fitted into an insulated casing. A translucent window is provided to protect the selenium plate. The elements consist of a metal plate on which a layer of selenium is smelted; a metal layer is then applied on top of this as a second electrode. This electrode is so thin that it will allow light to fall on the selenium.

The S.A.F. selenium cell

Silent Motors

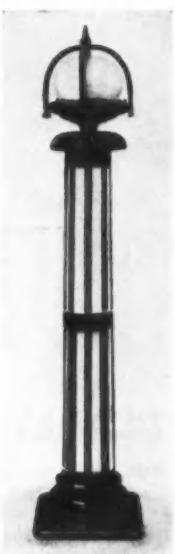
There are many cases where a silent motor is imperative, and in all situations the greatest silence possible is to be desired. BULL MOTORS, LTD., Ipswich, specialise in silent motors, and they have now developed a new range of 3-phase induction motors which are claimed to be even quieter than previous models. The ball bearings have been replaced by bronze sleeve bearings, and the squirrel-cage has been assembled under hydraulic pressure. Specially reinforced stator and rotor end plates ensure the maximum solidarity of rotor and stator cores, and a new type of ventilating fan which is silent when run in both directions has been incorporated.

All-illuminated Island Pillars

Modern road traffic conditions have necessitated the construction of islands at corners to ensure greater safety both to pedestrians and motorists, but unless they are well illuminated they are likely to be of considerable danger to the latter at night.

The adoption of all-illuminated pillars on the edges of islands should overcome this difficulty, and THE BRIGHTON LIGHTING & ELECTRICAL ENGINEERING CO., LTD., St. Martin's Place, Lewes Road, Brighton, is marketing what the company believes to be the first all illuminated pillar.

It consists of an iron standard, panelled with ⅜-in. white diffused plate glass, with a coloured lamp at the top. The same company has recently manufactured the new type of traffic control signal known as the Semaphore system, which has been installed at the Aquarium crossing at Brighton.



The all-illuminated island pillar

An Electric Trouser Press

"To press trousers to a knife edge crease in ten minutes" is the claim made by MESSRS. F. MACK & CO., 12, Henrietta Street, W.C.2, for their new "rapid electric plate." The apparatus is simple in design, the element being housed in a rectangular casing somewhat larger than a trouser leg. In order to press a pair of trousers one leg is placed on each side of the casing which is inserted in an ordinary trouser press. Damping is not considered necessary. The supply is then switched on and the creasing operation takes from five to ten minutes. It is also applicable to other articles such as handkerchiefs and ties in place of ironing.

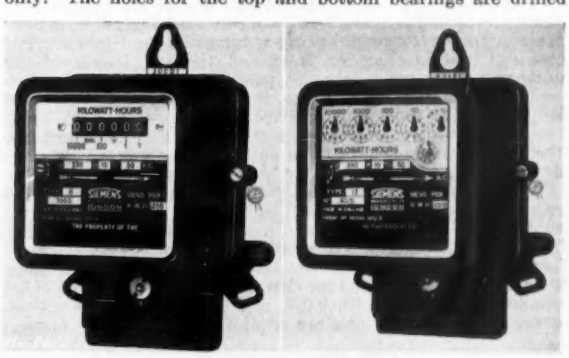
The element is spread over the entire surface of the press and is housed in asbestos, which is, in turn, enclosed in a metal casing covered with "Wyncette" cloth to prevent shining of the trousers. The weight is 6½ lb. and the loading of the element 350 W.

New House Service Meters

Two new single-phase, two-wire, house-service integrating kWh meters, are being manufactured by MESSRS. SIEMENS BROS. & CO., LTD., Woolwich.

They are known as types 11 and 12 and are similar, except for the counter mechanisms; the former is of the cyclometer type, and the latter is fitted with "pointer dials" in accordance with British Standard Specification, 1930/37.

The frame is made in one piece, and is designed to allow the rotor to be withdrawn without affecting the calibration of the meter. It is made from mild steel welded at two points only. The holes for the top and bottom bearings are drilled in a specially designed machine to ensure correct alignment of bearings. Both the frame and magnet are aluminium coated to render them impervious to ordinary climatic conditions, and to prevent "flaking."



Two new Siemens meters, types 11 and 12

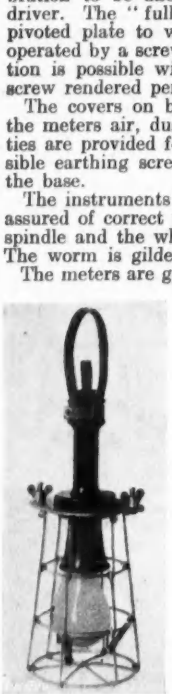
All the adjustments on the meters can be operated from the front with a screw-driver. The "low-load" adjuster is a spring-loaded micrometer screw, so arranged that even if the clamping screw is overlooked, it is impossible for the cali-

bration to be affected without further resort to the screwdriver. The "full-load" (or magnet) adjuster comprises a pivoted plate to which the magnet is secured and which is operated by a screw-headed eccentric cam. Very close calibration is possible with this device, which also has a clamping screw rendered perfectly effective by a spring-washer.

The covers on both types are interchangeable, and render the meters air, dust and damp tight. Separate sealing facilities are provided for main and terminal covers, and an accessible earthing screw is fitted to the right-hand fixing lug on the base.

The instruments are fitted with a device whereby users are assured of correct re-meshing between the worm on the rotor spindle and the wheel on the counter which engages with it. The worm is gilded to prevent possible tarnishing.

The meters are guaranteed to start on a load of 0.3 per cent. of rated full-load watts. The power losses total only 1.3 W, the shunt loss is 0.80 W, and the series system accounts for 0.50 W.



The new G.E.C. inspection lamp

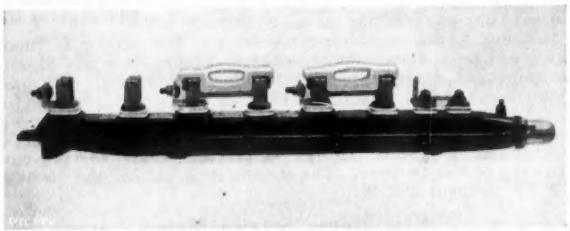
A Factory Type Inspection Lamp

A new handlamp has been designed by the GENERAL ELECTRIC CO., LTD., to cover all the conditions in factory and installation work. The handle is made of ebonised hardwood, and a strong galvanised wire guard is incorporated. The engagement of the lamp is operated by means of a patent spring ring attachment which also holds it in position. The lamp cannot be used unless the guard is properly secured in position, and if the bulb is shattered the lamp cap is automatically ejected, while if the glass should become cracked the retaining ring helps to hold the glass together. The fixing of the lamp provides an efficient buffer and shock absorber.

New B.I. Products

We learn from BRITISH INSULATED CABLES, LTD., that they are now manufacturing copper matting in a fluted finish, similar to their No. 6 pattern for aluminium, supplied in sheets up to 8 ft. by 3 ft., and in gauges from 18 s.w.g. upwards.

A development in the "Rockbestos" line, of which they are manufacturers, is "Rockbestos" and varnished cambric

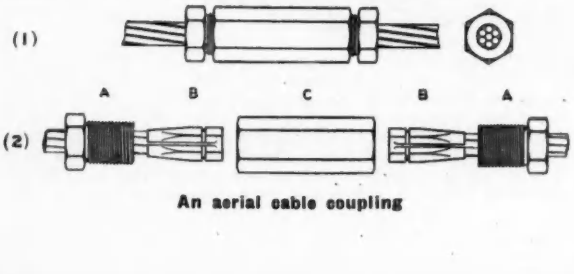


The new B.I. Pillar Unit

insulated copper strip for connections to heating elements. A quantity of this has recently been supplied for use in Russia for the heating elements of hopper wagons for the transport of ore, as ores in transit from mines to smelters freeze in cold weather unless the hoppers are heated, and cannot be tipped. These strips can be made in widths up to one inch. Another recent "Rockbestos" product is switchboard wire with multi-coloured braids, flameproofed or self extinguishing, for coding purposes.

In the latest type of B.I. pillar unit all the current carrying parts are of high conductivity copper, and the cable fittings are h.c. copper forgings having a tapered cone contact. The cast-iron sealing chamber is carried the full length of the unit, and all current carrying parts are enclosed and under compound at the back, while the sealing chamber is split longitudinally, the joint between the two halves being machined. Other important features of the new unit are the self-aligning bus bars. The units can be arranged for withdrawal either from the front or back of the pillar.

The cotton covering and braiding department at Prescot has recently been supplying P.B.J. cables with varnished cambric substituted for the impregnated paper tape next the conductor. To facilitate the jointing of small overhead cables the company has produced the simple aerial cable coupling, which we illustrate. This is standardised for British Standard sizes of stranded conductors of 0.025, 0.05, 0.075, and 0.1 sq. inch sizes. (Diagram 1.) No special tools are required for fitting, the method

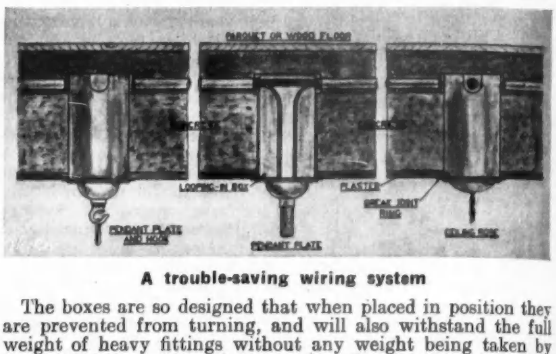


An aerial cable coupling

of assembly being to thread A (Diagram 2) on to the wire, insert the end of the wire into B, and then insert B into C and screw up with A.

A Looping-in System

In order to meet the requirements of the electrification of modern buildings, MESSRS. EDWARD HOLME & CO. (1931), LTD., Altrincham, have designed a simple looping-in system. This involves a considerable saving of time when fitting the boxes and conduits in position, as it is unnecessary to bend the conduit at the point of entering the boxes as in other systems.



A trouble-saving wiring system

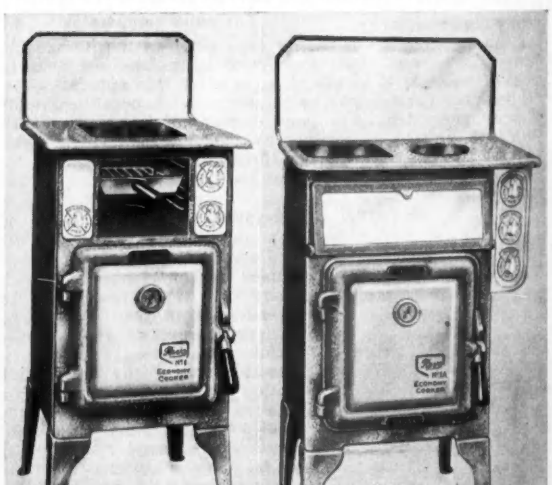
The boxes are so designed that when placed in position they are prevented from turning, and will also withstand the full weight of heavy fittings without any weight being taken by the conduit or ceiling plaster. After they are placed in position and all wiring completed the connections are easily accessible by the removal of the plate carrying the fitting. The boxes can be cast in position in the floors, in which case subsequent cutting out becomes unnecessary.

The fixing plates can be supplied with oxidised finish for the direct mounting of most types of fitting, while the boxes can be supplied to suit any type or thickness of floor.

Revo Cooker Developments

The REVO ELECTRIC CO., LTD., Britannia Works, Tividale, Tipton, is marketing a new addition to its "economy" range and has made changes in the design of the model "No. 1." The new cooker, "No. 1A," is intermediate in size and price between models "No. 1" and "No. 2," and has overall dimensions of 34 in. by 22 in. by 17¾ in. The oven space is 13¼ in. high, 14 in. deep, and 12¼ in. wide, making it the same size as the "No. 2" model and larger than the "No. 1," but the loading of the oven, heated by elements at the side, is only 1,330 W, as compared with the 1,400 W of "No. 2" and the 1,300 W of "No. 1."

The new cooker is designed on the same lines as the larger models, with the three-heat switches arranged vertically at the side of the cooker, and the grilling chamber, which again is the same size as the "No. 2" model (*i.e.*, 15½ in. wide, 13 in. deep, and 5 in. high), is fitted with the drop door which has been standardised on all models except "No. 1." The same rectangular boiler-griller (10 in. by 7 in.) has been used on all models, and is loaded at 2,500 W, but the cooker differs from



The "Revo" Nos. 1 and 1a

the larger model inasmuch as the smaller boiling plate is only 6¼ in. in diameter and is loaded at 1 kW, as compared with 8 in. diameter and a loading of 1,600 W. The "No. 1" model has no boiling-plate, but the boiler-griller has now been placed in the centre of the hob. In this cooker the grilling chamber is not enclosed and the switches are placed on each side of the grilling space; there are separate three-heat switches for the oven elements. The new "No. 2A" model is identical with "No. 2" except that the 1,400-W elements are at the sides only.

Canadian Electrical Trade

THE Canadian Government recently issued statistics of the import and export trade of the Dominion for the calendar year 1931. Details regarding the electrical trade are set out below, with notes of increase or decrease compared with the previous twelve months. It will be seen that Great Britain's share of the import trade is still very small compared with that of the United States. It is noteworthy that the export trade of the Dominion in electrical goods, although showing a sharp decline between 1930 and 1931, embraced a number of other parts of the Empire.

Imports

	1931 Thous. $	Inc. or Dec.
Batteries, primary—		
Total	130	— 10
From U.K.	1	— 1
„ U.S.	125	— 7
Batteries, storage—		
Total	450	— 210
From U.K.	220	— 160
„ U.S.	230	— 50
Heating and cooking apparatus—		
Total	380	— 80
From U.K.	1	— 4
„ U.S.	375	— 80
Dynamos and generators—		
Total	480	— 1,460
From U.K.	140	— 380
„ U.S.	310	— 830
„ Sweden	20	— 220
„ Switzerland	15	— 20
Fans—		
Total	100	— 110
From U.K.	2	— 1
„ U.S.	95	— 110
Fuse, fuse plugs and cutouts—		
Total	100	— 130
Lamps, metal filament—		
Total	38	— 6
From U.K.	2	—
„ U.S.	20	— 10
Torches, flashlights, head, side and tail lights (from April 1st to Dec. 31st, 1930)—		
Total	270	+ 100
From U.K.	3	— 1
„ U.S.	250	+ 90
Lighting, fixtures and appliances—		
Total	825	— 215
From U.K.	18	— 3
„ U.S.	760	— 220
Lightning arresters, choke coils, &c.—		
Total	80	— 50
From U.K.	1	— 1
„ U.S.	75	— 50
Meters—		
Total	200	— 170
From U.K.	50	— 25
„ U.S.	145	— 145
Motors—		
Total	1,910	— 1,300
From U.K.	340	— 260
„ U.S.	1,530	— 1,040
Rheostats, controllers, &c.—		
Total	270	— 440
From U.K.	25	— 55
„ U.S.	240	— 380
Self-contained lighting outfits—		
Total	14	— 46
Sockets, outlets and receptacles—		
Total	210	— 80
From U.K.	5	+ 5
„ U.S.	201	— 88
Spark plugs, magnetos, &c.—		
Total	230	— 480
From U.K.	14	+ 4
„ U.S.	210	— 480
Steam turbo-generator sets, 700 h.p. and greater, of a class or kind not made in Canada (from June 1st, 1931)—		
Total	220	—
From U.K.	120	—
„ U.S.	36	—
„ Switzerland	67	—
Switches, switchboards, and circuit breakers—		
Total	960	— 1,270
From U.K.	95	— 230
„ U.S.	860	— 990
Telegraph apparatus—		
Total	95	— 305
From U.K.	35	— 55
„ U.S.	60	— 310
Telephone apparatus—		
Total	1,510	— 1,420
From U.K.	315	— 60
„ U.S.	1,195	— 1,360
Transformers—		
Total	530	— 420
From U.K.	335	— 90
„ U.S.	190	— 330
Radio valves—		
Total	115	— 215
From U.K.	12	— 8
„ U.S.	100	— 205
Radio apparatus—		
Total	4,785	— 2,975
From U.K.	30	— 40
„ U.S.	4,720	— 2,930
Electrical apparatus n.o.p.—		
Total—	2,760	— 2,245
From U.K.	125	— 60
„ U.S.	2,570	— 2,170
„ Switzerland	39	+ 2
Total electrical apparatus, lamps and fixtures—		
Total	16,775	— 13,505
From U.K.	1,885	— 1,310
„ U.S.	14,515	— 11,905

* From Jan. 1st to March 21st only.

Exports

Comparative figures of the export trade in batteries, and telegraph, telephone and radio apparatus are not available as the classification was altered in 1931.

	1931 Thous. $	Inc. or Dec.
Batteries—*		
Total	53	—
Batteries, storage‡—		
Total	100	—
To New Zealand	53	—
Batteries, unenumerated‡—		
Total	32	—
Telegraph, telephone and radio apparatus—		
Total	145	—
To U.K.	15	—
„ U.S.A.	20	—
„ Newfoundland	10	—
„ New Zealand	50	—
„ Brazil	28	—
Dynamos, generators, and motors—		
Total	11	— 54
To U.S.A.	4	— 13
Cooking and heating devices—		
Total	550	— 280
To Irish Free State	20	— 60
„ Brit. S. Africa	370	+ 60
„ New Zealand	90	— 170
„ China	26	+ 1
Spark plugs, magnetos, &c.—		
Total	240	— 120
To U.K.	160	— 10
„ Brit. S. Africa	30	+ 10
„ Japan	12	— 2
Other electrical apparatus—		
Total	210	— 240
To U.K.	35	— 25
„ U.S.A.	20	— 10
„ Newfoundland	15	— 40
„ Australia	3	— 9
„ New Zealand	30	— 70
„ Brazil	6	— 1
„ Japan	6	— 34
„ Mexico	85	— 25
Total electrical apparatus—		
Total	1,343	— 848
To U.K.	225	— 45
„ U.S.A.	50	— 50

‡ From April 1st to Dec. 31st only.

British Overseas Electrical Trade in May

THE Board of Trade returns of Great Britain's overseas electrical trade in May are somewhat disappointing. Although exports declined by £106,243, there was an increase of £26,680 in goods imported, a rise in machinery imports being mainly responsible for the latter.

The decrease in exports of electrical machinery from £409,231 in April to £330,449 last month is due to a serious falling off in the shipments to European countries (£95,837, against £158,851) and Canada (£5,485, against £58,128). Australia (£7,256) also purchased £10,804 less, but there were increases of £12,740, £1,787, £13,693, £6,077 and £12,345 respectively in the exports to South America (£26,146), South Africa (£71,401), British India (£67,323), New Zealand (£10,688), and "other countries" (£44,489).

Except for increases of £45,169 and £19,627 in electrical machinery exported to South Africa and British India, last month's figures are practically all below those for May, 1931, the principal decreases being in the purchases of Australia (£12,990 decrease), Canada (£20,464), and "other countries" (£7,503).

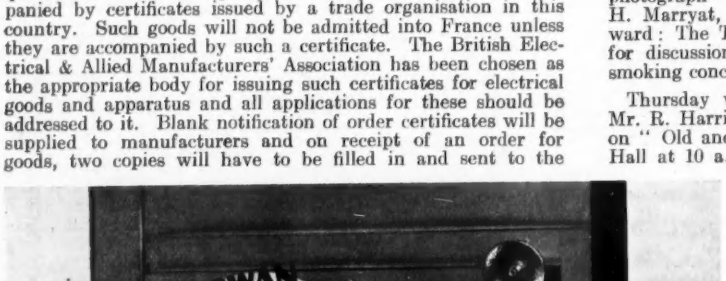
	EXPORTS.			IMPORTS.			RE-EXPORTS.		
	Electrical exports for May, 1932.	Inc. or dec. as compared with April, 1932.	Inc. or dec. as compared with May, 1931.	Electrical imports for May, 1932.	Inc. or dec. as compared with April, 1932.	Inc. or dec. as compared with May, 1931.	Electrical re-exports for May, 1932.	Inc. or dec. as compared with April, 1932.	Inc. or dec. as compared with May, 1931.
Insulated wires and cables	£100,504	+ £20,768	— £452	£13,510	— £4,158	— £40,703	£13	— £591	— £227
Electric carbons	1,212	— 6,186	+ 376	3,871	— 1,590	— 4,780	207	+ 162	+ 181
Arc lamps and searchlights	175	— 810	— 1,123	42	— 586	— 27	—	— 99	— 54
Incandescent lamps	28,153	— 443	+ 2,548	6,866	— 1,393	— 14,072	326	+ 87	+ 156
Other lighting apparatus	25,115	— 1,442	— 2,128	13,628	+ 674	— 25,779	948	— 989	+ 309
Batteries and accumulators	42,362	— 25,906	— 14,055	3,129	— 99	— 31,954	105	— 1,472	— 8,237
Meters and instruments	24,144	— 4,091	— 920	21,379	— 232	— 11,295	364	— 53	— 364
Unenumerated goods and apparatus	76,826	— 8,328	— 57,392	36,594	— 4,541	— 41,407	4,766	+ 997	— 812
Telegraph and Telephone Cable and Material—									
Telegraph and telephone wires and cables (not submarine)	13,654	— 16,789	— 37,208	82	— 15	— 1,433	—	—	— 25
Submarine telegraph and telephone cables	—	— 761	— 8,397	—	—	—	—	—	—
Telegraph and telephone apparatus	138,627	+ 16,527	— 52,752	37,672	+ 5,798	— 67,633	2,051	— 6,562	— 16,055
Electrical Machinery—									
Railway and tramway motors	14,080	+ 8,149	+ 13,577	—	—	—	—	—	—
Other motors and generators	107,132	— 9,394	— 14,760	—	—	—	—	—	—
Unenumerated electrical machinery	209,237	— 77,537	+ 12,617	85,937	+ 32,822	— 57,732	5,047	— 2,789	— 5,149
Total	£781,221	— £106,243	— £160,039	£222,710	+ £26,680	— £296,865	£13,827	— £11,309	— £30,277
Decreases for the first five months of the year		Exports. £1,478,675			Imports. £1,219,804			Re-exports. £54,302	

Business and Industrial Notes

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures

British Electrical Manufacturers and the French Quota

It has now been arranged with the French Government that exports to France of electrical goods which are subject to quota restrictions on importation into France are to be accompanied by certificates issued by a trade organisation in this country. Such goods will not be admitted into France unless they are accompanied by such a certificate. The British Electrical & Allied Manufacturers' Association has been chosen as the appropriate body for issuing such certificates for electrical goods and apparatus and all applications for these should be addressed to it. Blank notification of order certificates will be supplied to manufacturers and on receipt of an order for goods, two copies will have to be filled in and sent to the Association's offices. One copy will be retained by the Association and the other sent on to the appropriate French Syndicat. Applications for French import certificates have to be made within thirty days of the due date of delivery.



An " Ediswan " special fire window display

Goods which come under the new quota regulations are as follows: Dynamo-electric machines and industrial electric transformers, dry or in oil; dynamo-electric machines for motor vehicles of all kinds (except those combined with ignition apparatus for i.c. engines); current rectifiers; apparatus for cutting-off, regulating, protecting and distributing electric current, including electric distribution boards whether fitted up or not; electric accumulators of all kinds and their component parts; certain electrical measuring instruments and transformers for these. The British quota in its major portion, it has been decided, is to be divided between interested British firms in proportion to their deliveries during 1931; and information has been already asked for to enable the quotas to be allocated. The French authorities have arranged for the system to be put into force on July 1st.

Switchgear Exhibits at Croydon

At its premises at 516, London Road, Croydon, last week, the General Electric Co., Ltd., held an exhibition of ironclad switchgear. Some six hundred electrical contractors, supply engineers, and owners of factories in the district, were invited, and the attendance well surpassed expectations. The exhibits, which included all sizes and types of switch and fusegear, circuit breakers, cut-outs, motor starters and instruments, were carefully and attractively classified on a number of small panels, which rendered it possible for visitors to be shown without delay and in a practical manner a selection of the most up-to-date apparatus of the kind in which they were most particularly interested. The methods of manufacturing " Osram " lamps were also illustrated by means of a film, and an exhibition of the various components, and there was a display of the various types of lamp, ranging from a 10-kW lighthouse lamp to a flashlamp. At the right of our illustration is a model of a 132-kV grid transforming station.

The G.E.C.'s exhibition of switchgear

The E.C.A. Conference

The attention of a large and important section of the electrical industry will next week be directed to Southport, Lancashire, where, after the usual formalities in connection with the registration of delegates, &c., there will be a reception at the Prince of Wales Hotel by the president, Mr. W. R. Rawlings, A.M.I.E.E., who is ending his third period of office. Following the annual general meeting of the E.C.A. and Allied Associations at the Cambridge Hall on Wednesday there will be at noon a civic welcome by the Mayor of Southport, Councillor W. H. Bellis, LL.B., to which the president will reply. The presidential address will be given immediately after this, and the final item scheduled for before lunch is " official photograph " (12.45 p.m.). In the afternoon (2.30 p.m.) Mr. H. Marryat, M.I.E.E., will present a paper " Looking Forward: The Trend of Trade," which, of course, will be open for discussion. The day's proceedings will conclude with a smoking concert in the Prince of Wales Hotel.

Thursday will see the delegates in conference early, for Mr. R. Harrison-Watson, M.I.E.E., is due to present a paper on " Old and New Installation Problems " at the Cambridge Hall at 10 a.m. The subsequent discussion will be followed by the installation of the new president, Mr. W. B. Williams, of Bristol, who will then give a short address. Mr. H. J. Cash is the new vice-president.

The remainder of the conference will be devoted to the social side, and will include a garden party in the Municipal Gardens, Lord Street, at 2.30 p.m., and a ball and supper at the Prince of Wales Hotel at 8.30 p.m., at the invitation of the Mayor.

" Ediswan " Window Displays

In connection with its 1932 window display campaign the Edison Swan Electric Co., Ltd., has published a descriptive folder containing illustrations, together with details, of six attractive and colourful displays available to dealers throughout the country. Besides two general displays there are special ones for irons, fires (illustrated herewith), kettles, and toasters.

A Scottish Electrical Development Committee

A committee set up by the Scottish National Development Council—the Committee on Electrical Developments in Scotland—held its inaugural meeting in Glasgow on June 13th. The members of the Committee are:—Mr. C. J. Hunt (chief engineer of Bruce Peebles & Co., Ltd.), chairman; Sir James Lithgow (ex-officio); Mr. Robert Robertson; Professor G. W. O. Howe (Glasgow University); Mr. Sam Mavor (Mavor & Coulson, Ltd.); Mr. E. T. Goslin (Clyde Valley Electrical Power Co.); Mr. D. G. Bishop (city electrical engineer, Dundee); Mr. E. Seddon (city electrical engineer, Edinburgh); Mr. J. C. Macfarlane (Macfarlane Engineering Co., Ltd.); Mr. H. C. Babb (Lothians Electric Power Co.); Mr. H. A. McGuffie (Stevenson & McGuffie); Mr. H. H. Partington (Grampian Electricity Supply Co., Ltd.); and Mr. C. R. Kemp (Harland Engineering Co., Ltd.). Ex-provost A. Anderson (Anderson and Boyes) has also been invited to join the Committee.

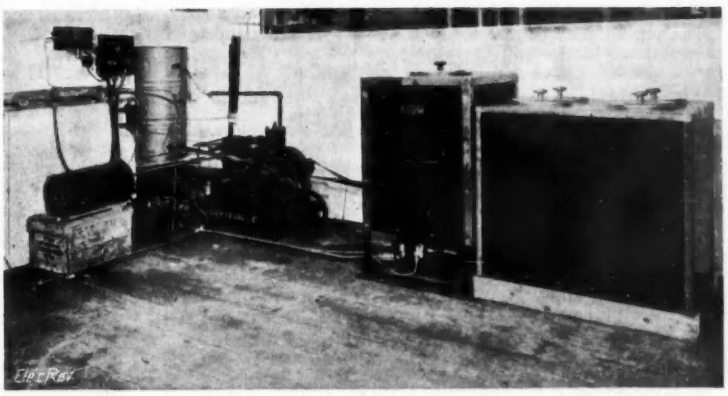
Sir James Lithgow said that they were all sorry to learn that Mr. Hunt, on account of illness, would not be able to take the chair for some little time. It was agreed that two sub-committees should be constituted, one to deal with the supply of power and the extension of its uses, and the other to formulate recommendations in connection with an extension of the manufacture of electrical appliances in Scotland. It was agreed that, in order to ensure all-round representation on the sub-committees, representatives of the consumers of power and of users of electrical appliances would be invited to join the sub-committee.

In addition, adequate steps were taken to ensure that the committee would maintain contact with other technical committees of the Council on points which were of mutual interest.

Ice-cream Making

An interesting installation for the manufacture and storage of ice-cream has just been carried out in a place in Surrey where a public supply of electricity is not available. The equipment consists of a 4-gallon "Kelvinator" direct expansion freezer and an 8-hole hardening and storage cabinet, refrigerated by a "Kelvinator" condensing unit driven by a fully automatic petrol engine, which also drives the revolving can type freezer by means of a flat belt and fast and loose pulleys, operated by a belt striking gear on the freezer. The energy for starting is supplied by a 6-volt starter battery, which is kept fully charged by a combined "Magdyno," which provides the high voltage current for ignition as well as the battery charging current. The starting motor is switched on by means of a relay operated by a special "Kelvinator" pressure type controller. When the engine picks up speed a centrifugal switch incorporated in the drive to the "Magdyno" breaks the relay circuit, thus cutting out the starting motor. To prevent the complete discharging of the battery should the engine fail to start in a few minutes, a thermal time cut-out is fitted. To guard against the overloading of the battery a centrifugally operated automatic clutch is fitted inside the flywheel, which takes up the load when the engine has run up to a predetermined speed.

About 80 yards away from the main plant a portable 4-hole storage cabinet has also been installed. This is driven by a small petrol engine driven dynamo and accumulator set, which provides the electric light for the premises, but is too small to operate the main plant.



Ice-cream making equipment

Ashton-under-Lyne Showroom Criticised

Despite criticism of the local electrical showroom, which is stated to be losing £30 per week, the Ashton-under-Lyne Electricity Committee put up a good defence when the showroom enterprise was discussed at the June Town Council meeting. The chairman of the Electricity Committee said they could not get on without advertising, and, having regard to the number of cookers that were now in use, and the tendency for people to make more generous use of domestic appliances in the home, he would be greatly opposed to closing the showroom. It was really necessary to let people know what they could buy.

Lancashire Jewellers and Electric Clocks

At two separate gatherings of Lancashire jewellers, held recently at Colne and Blackburn, it was generally conceded that the electric clock had come to stay. It was intimated that there were now on the market Westminster chime clocks operated by electricity. It was stated that both the Colne and Blackburn Associations had instituted inquiries among electricians with a view to forming panels of contractors prepared to do the necessary wiring in the event of electric clocks being supplied to houses and business establishments by jewellers. It was mentioned that several quotations had been given at so much per point, and this would permit the jewellers to supply on competitive terms. Mr. H. Holt, the Lancashire Jewellers' secretary, said that it was important that the modern jeweller should make himself thoroughly conversant with the whole subject of electricity, so that he would then be in a position to be able to advise the customers who came to purchase electric clocks, &c. Mr. A. Worden, president of Blackburn Association, said he feared that the early supplies of electric clocks would be quickly supplanted by more modern models. Therefore, they ought to be ultra-cautious in their purchases, otherwise they might find themselves with unsaleable stock in their possession.

The floodlighted Prudential "picture gallery"

Testing "Osram" Lamps in the Carton

An innovation has recently been introduced at the Osram Lamp Works whereby the lamps are actually tested and light up in the cartons just before they are packed into the fiberite containers for despatch. The possibility of a lamp being damaged after final testing before being boxed is thereby eliminated.

Trade in Norway

According to a Department of Overseas Trade report (Stationery Office, 2s. 3d.) on economic conditions in Norway, financial and commercial difficulties arising from international causes which affected the whole world in 1931 were enhanced in Norway by events of more local significance. Industrial activity was brought to a standstill for five months owing to labour difficulties, and later the situation was further complicated by a serious banking crisis. Imports of electrical machinery and apparatus declined from 20,535,800 kroner in 1930 to 18,913,320 kr. in 1931. Exports of electric motors fell from 47,101 to 40,427 kg., but telephone and telegraph apparatus exports increased from 16,961 to 22,780 kg. The position of Norway's imports shows a notable improvement, and an opportunity now exists for obtaining a firmer foothold in this market.

Wages in the Cable-making Industry

The Joint Industrial Council for the Cable-making Industry announces that the cost-of-living figure for June 1st was 42 per cent. above the pre-war level. This does not involve any alteration in wages on the third pay day in July.

Sunderland Tramwaymen's Wages

A joint conference of the Sunderland Corporation tramwaymen and members of the Tramways Committee is to be held shortly to discuss the wages question. It is understood that, owing to the falling off in the revenue derived from the undertaking, the men will be asked to accept a reduction of 2s.

Conditions in Estonia

A Department of Overseas Trade report on the economic conditions in Estonia (Stationery Office, 9d.) indicates that the country is sharing in the prevailing depression and economic anxiety. Although there are a number of industrial undertakings, Estonia is essentially an agricultural country, and a very bad harvest was experienced in 1928, the effects of which have not yet fully worked off. There has been a reduction in the total turnover of foreign trade, and the restrictions imposed upon imports both directly and by means of the exchange control are likely to lead to a still lower volume in 1932.

Floodlighted Pictures

In front of the extensions to the Prudential Assurance buildings, Holborn Bars, E.C.1, a kind of picture gallery has been erected to set forth the advantages of insurance. At night this is illuminated by 200-W "Siemens" lamps in "Benjamin" elliptical reflectors, and the good result is apparent from the accompanying illustration. The installation was carried out by the Prudential Assurance Company's own engineering staff.

Recent Contracts

Messrs. F. Reid, Ferens & Co. have secured the contract for the electric street lighting in Upper Weardale for the following places:—Crawleyside, Stanhope; Eastgate; Westgate; Daddry Shield; Freshopeburn; Blackdene; St. John's Chapel; Wearhead; and Gowshill.

Siemens Electric Lamps & Supplies, Ltd., has received a running contract from the London County Council for the supply of "Silvalux" opal, gasfilled traction lamps for tramcars.

An Inquiry

Mr. E. P. Griffin, wholesale electrical factor, Tylehurst, Oyster Lane, Byfleet, Surrey, asks for manufacturers' prices of electrical accessories, cables, fittings, &c.

Trade in the Netherlands

There is no marked depression in the state of trade in the Netherlands, although its interdependence on the conditions in other countries renders it open to decline should there be no improvement, states a Department of Overseas Trade report (Stationery Office, 3s. 6d.), on the economic conditions prevailing in 1931. Prospects for British trade are not unsatisfactory, though the purchasing power of a number of potential customers has been reduced.

German Electrical Imports and Exports

The official returns just to hand show that the imports of electrical machinery and apparatus into Germany during the three months ended with March last attained a value of £323,300, as compared with £559,750 in the corresponding three months of 1931. The exports of similar material from Germany during the three months amounted to £4,652,800, this comparing with £6,336,900 during the corresponding period last year. The import total was made up of £49,250 of electrical machinery, and parts and apparatus £274,050. The respective figures for the exports were £1,036,000 and £3,616,800.

New Japanese Company

The Muroran Electric Light Co., Ltd., has recently been formed in Japan with a capital of 1,500,000 yen to take over the electricity supply to the Hokkaido Colliery and Steamship Co. It is proposed to extend considerably the capacities of the generating and distributing equipment.

A Mobile Floodlight

A new method of floodlighting sports grounds or aerodromes has recently been introduced. The apparatus is manufactured by Messrs. Chance Bros. & Co., Ltd., and it is mounted on a Morris-Commercial 35-40-cwt. open-ended van. Current is supplied by a dynamo connected with a secondary propeller shaft driven from the gear box. The floodlight has a ground

A mobile floodlighting installation

and polished dioptric lens of 500 mm. diameter, and covers a horizontal angle of 180 deg. A 5-kW gas-filled electric filament lamp is used, and a small ventilator fan and motor are fitted in the roof of the lantern to draw the heat away from the lamp. The floodlight can be hand operated. The vehicle shown in the accompanying illustrations has roll-up sides and has been despatched to Ballydonnell Aerodrome, Dublin.

Indian Fan Imports

The total value of electric fans imported into India during the year 1929-30 was Rs.3,980,000. The United Kingdom was the largest supplier with a total value of Rs.1,890,000, a decrease of Rs.480,000 as compared with 1928-29, the next largest importer being Italy with Rs.1,208,253, an increase of Rs.174,388.

Architects Visit Metrovick Works

Members of the Royal Institute of British Architects paid a visit to the Metrovick works at Trafford Park last week. After a tour through the factory and new buildings the visitors inspected the high-voltage laboratory. Considerable interest was displayed in a subsequent visit to the company's new acoustic laboratory, where motors specially designed for silent running were demonstrated.

Canadian Vacuum Cleaner Trade

In the Canadian trade returns electric vacuum cleaners are not included under electrical apparatus but are recorded separately. Exports last year were 52,569 in number and $1,912,999 in value, as compared with 56,092 valued at $2,232,011 in 1930. The United Kingdom is the Dominion's principal customer, taking in 1930 no fewer than 49,225, valued at $1,800,877. Imports of these articles are few, and practically all from the United States.

Battery-making Machinery Wanted

A London company informs us that it requires two machines for putting muslin sacs round the carbon dollies of normal flash-lamp and radio high-tension batteries. We shall be pleased to pass on the names of manufacturers to our correspondents.

Inventions Exhibition

The eighth International Exhibition of Inventions will be opened by the Lord Mayor of London at the Central Hall, Westminster, S.W., on October 5th.

A Large Pumping Station

Messrs. W. H. Allen, Sons & Co., Ltd., were the main contractors for the plant installed at the Abbey Mills pumping station of the London County Council, which was described in our issue of June 10th.

Social Events

A touring team of the cricket club of Messrs. A. Reyrolle & Co., Ltd., has during the current week been in London to fulfil the following fixtures:—Monday: Henley's Club at Gravesend; Tuesday: Charing Cross Electricity Supply Co.'s Club at Kew; Wednesday: Faraday House Club at Molesey; Thursday: The North Metropolitan E.P.S. Co.'s Club at Brimsdown. This is the fourth year that the club has undertaken a tour, previous visits having all been to Northern Ireland.

The annual staff outing of the General Electric Company, Ltd., Glasgow, took place on June 11th to Rothesay. A party of 200 enjoyed a well-arranged programme for which Mr. William Aitken, the hon. secretary, was mainly responsible. A sports meeting was held for which prizes were given by Mr. Sims, Mr. Black, and Mr. Wilson. Mrs. Black presented the prizes to the winners.

The annual amateur championship sports and gala of the London establishments of the General Electric Co., Ltd., will be held at the company's sports ground, Preston Road, Wembley, to-morrow (June 25th).

The Athletic and Social Club of Callender's Cable and Construction Co., Ltd., is holding its annual sports meeting on the club ground, Belvedere, to-morrow (Saturday), commencing at 2.45 p.m. The events will include a 660-yd. relay championship in which fourteen international runners will compete, and a North v. South sprint trial.

The Timber Trade

The call for general timbers over the past month has been unusually quiet for the time of the year, and as the European varieties are the largest used in this country they have been the first to feel the weakening in prices. Stocks of all building woods in this country are low. There also is little call for hardwoods and too much is coming from the United States to keep the market steady. Empire woods are being imported a little more freely on account of the 10 per cent. duty on foreign wood, and the demand is likely to increase.

Prices of Materials

The following prices are only general, and they may vary according to quantities and other circumstances:—

	CHEMICALS, Etc.	Price June 22nd.	Fortnight's Inc. or Dec.
a	Acid, Oxalic ... ... per lb.	5½d.	—
a	Ammoniac, Sal ... ... per ton	£60	—
a	Ammonia, Muriate (large crystal) ... ,,	£52	—
a	Borax ... ... ,,	£17	—
a	Copper Sulphate ... ... ,,	£25 10s.	—
a	Potash, Chlorate ... ... per lb.	3½d. to 4½d.	—
a	,, Perchlorate ... ... ,,	5½d.	—
a	Shellac T.N. ... ... per cwt.	£3 15s.	—
a	Sulphur Commercial ... ... per ton	£11	—
a	,, Roll ... ... ,,	£11	—
a	Soda, Chlorate... ... ... per lb.	3½d. to 3¾d.	—
a	,, Crystals... ... ... per ton	£5 to £5 5s.	—
a	Sodium Bichromate, casks ... ... per lb.	4d.	—
	METALS, Etc		
b	Aluminium, Ingots ... ... per ton	£95 to £100	—
b	,, Wire ... ... per lb.	1/1 to 1/9	—
b	,, Sheet and Foil ... ... ,,	1/1½ to 2/9	—
p	Babbits Metal and Anti-friction Metals—		
	Grade I ... ... per ton net	£111	£2 dec.
	Grade II ... ... ,,	£79	£2 dec.
	Grade III ... ... ,,	£46	£1 dec.
c	Brass (rolled metal 2" to 12" basis)... per lb.	6¼d.	—
c	,, Tubes (solid drawn) ... ... ,,	8½d. to 9d.	—
c	,, Wire, basis ... ... ,,	7½d.	—
c	Copper Tubes (solid drawn) ... ... ,,	9d.	½d. dec.
g	,, Bars best selected) ... ... per ton	£59	—
g	,, Sheet ... ... ,,	£59	—
g	,, Rod ... ... ,,	£59	—
g	,, (Electrolytic) Bars ... ... ,,	£36 5s.	15s. inc.
d	,, ,, Sheets... ... ,,	£64	15s. inc.
d	,, ,, Wire Rods ... ,,	£40 5s.	15s. inc.
d	,, ,, H.C. Wire ... per lb.	6¼d.	¼d. inc.
f	Ebonite Rod ... ... ,,	1/3 to 1/6	—
f	,, Sheet ... ... ,,	1/3 to 1/6	—
m	German Silver Wire ... ... ,,	2/2	—
k	Gutta-percha, fine ... ... ,,	nom.	—
k	India-rubber, Para fine ... ... ,,	3¾d.	—
i	Iron, Pig (Cleveland No. 3) ... ... per ton	58/6	—
i	,, Wire, galve. No. 1, P.O. qual. ,,	£20	—
g	Lead, English pig ... ... ,,	£11 10s.	5s. dec.
g	Mercury ... ... per bot.	£11 15s. to £12 5s.	£2 dec.
e	Mica in original cases) small ... per lb.	6d. to 8/6	—
e	,, ,, medium ... ,,	4/- to 8/-	—
e	,, ,, large ... ,,	8/6 to 17/6 & up	—
p	Phosphor Bronze, plain castings ... ,,	1/1d.	—
p	,, ,, drawn bars & rods ,,	10½d.	—
p	,, ,, rolled strip & sheet ,,	10½d.	—
p	,, ,, wire ... ... ,,	11½d.	—
o	Platinum ... ... per oz.	£9 15s.	—
d	Silicium Bronze Wire... ... ... per lb.	7½d.	—
r	Steel, magnet, in bars ... ... ,,	7½d.	—
g	Tin, Block (English) ... ... per ton	£115 15s. to £117 15s.	£1 dec.
n	,, Wire, Nos. 1 to 16 ... ... per lb.	3/1	—

Quotations supplied by:—

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India-Rubber, Gutta-Percha and Telegraph Works Co., Ltd.
g James & Shakespeare.
h Edward Till & Co.
i Boiling & Lowe.
j Richard Johnson & Nephew, Ltd.
m P. Ormiston & Sons.
o Johnson, Matthey & Co.
p C. Clifford & Son, Ltd.
r W. F. Dennis & Co.

For Sale

The Wholesale electrical business of the Enterprise Mfg. Co., Wimbledon, is offered for sale.

Messrs. Leopold Farmer & Sons are to sell by auction on July 19th the factory and plant of Messrs. James & Frederick Howard, Ltd., at Bedford.

(See our advertisement pages to-day.)

A Refrigerator Display at Manchester

A display of "Leda" refrigerators in the showrooms of the Manchester Corporation Electricity Department, St. Ann Street, Manchester, is arousing much interest locally and many trade inquiries have been received as a result. The

A display of "Leda" refrigerators

"Leda" domestic cabinet is to be seen on the right of our illustration, with a wine cooling cabinet on the left. An E.D.A. refrigeration showcard is in the centre of the background and a "Leda" compressor in the front.

New Catalogues and Lists

Sturtevant Engineering Co., Ltd., 147, Queen Victoria Street, E.C.4.—Publication No. 1490, dealing with electrolytic precipitation.

Lancashire Dynamo and Crypto, Ltd., Trafford Park, Manchester.—A leaflet on motors for laundries.

British Boiler Circulators, Ltd., 8, Broadway, Westminster, S.W.1.—A pamphlet, entitled "Boiler Efficiency by Water Circulators."

Elliott Brothers (London), Ltd., Century Works, Lewisham, S.E.13.—Catalogue No. 812, illustrating and describing "Siemens" electrical recorders for heat economy and control.

Simplex Conduits, Ltd., Garrison Lane, Birmingham.—A blotter published in connection with the opening of the company's new depôt in Freeman Street, Birmingham.

A. Reyrolle & Co., Ltd., Hebburn-on-Tyne.—A leaflet on metal-clad plugs and switches for domestic purposes.

British Thomson-Houston Co., Ltd., Rugby.—A card describing the "Mazda Cruciform" lamp for home altars and shrines.

R.C. Radio-Electric, Ltd., York House, Southampton Row, W.C.1.—Particulars of a soldering iron and a self-feeding soldering attachment.

Edison Swan Electric Co., Ltd., 123-5, Queen Victoria Street, E.C.4.—Copies of pearl and motor lamp bulb window transfers.

Cambridge Instrument Co., Ltd., 45, Grosvenor Place, S.W.1.—List No. 902 giving details of the "Cambridge" instruments which are used in the food and drink industries.

Falk, Stadelmann & Co., Ltd., 83-93, Farringdon Road, E.C.1.—A revised price list of "Hitest" cables, "Efesca" flexibles and bell wires.

Heyes & Co., Ltd., Water-Heyes Electrical Works, Wigan.—The June "Wigan Review," containing particulars of the company's pressed steel prismatic fittings.

Marelli & Co., Ltd., 19 & 20, Garlick Hill, Queen Victoria Street, E.C.4.—List No. S.M. 434, giving particulars of various types of fractional h.p. motors.

David Brown & Sons (Huddersfield), Ltd., Park Works, Lockwood, Huddersfield.—An illustrated booklet describing in detail the chemical analyses and physical properties of the company's "Taurus" bronze castings.

Bankruptcy Proceedings

A. Prosper, electrical engineer, 4, Oak Tree Villas, Green Lanes, Palmers Green, N.—Receiving order made June 11th on debtor's own petition.

F. Lockett, electrical dealer, 45a, Parrs Wood Road, Didsbury, Manchester.—Receiving order made June 13th on debtor's own petition.

R. D. Lewis, electrical engineer, 1, Clifton Grove, Wallasey.—Last day for receiving proofs for dividend July 2nd. Trustee, Mr. J. Allcorn, Government Buildings, Victoria Street, Liverpool.

D. L. Gibson (James Rush & Co., and the Hadrian Engineering Co.), wireless retailer and manufacturer, 31-33, Westgate Road, Newcastle-upon-Tyne.—First dividend of 1s. in the £, payable July 2nd at the Trustee's office, 2, Saville Place, Newcastle-upon-Tyne.

G. Shilvock (G. Shilvock & Son), electrical contractor, 197, Railway Terrace, Rugby.—Public examination July 4th at the County Hall, Coventry.

H. W. Langford (trading as A. Pritchard & Co.), electrical and automobile engineers, High Street, Lye, Worcestershire.—Gross liabilities of £2,663 and a deficiency of £1,174 were disclosed in this debtor's statement of affairs when he attended at the Court House, Hagley Road, Stourbridge, on June 8th for his public examination. He attributed his failure to "contracting at under cost, keen competition, and paying high wages." The examination was adjourned.

T. S. Moore, electrical engineer, 29, Myrtle Street, Liverpool.—Receiving order made June 9th on debtor's own petition. Public examination July 26th at the Court House, Government Buildings, Victoria Street, Liverpool.

R. Dring, electrical engineer, 257, Freeman Street, Great Grimsby.—Discharged as from February 11th, 1933.

R. Moorhouse, wireless engineer, 229, Castleford Road, Normanton.—Trustee, Mr. T. A. Stoker, 71, Albion Street, Leeds, appointed June 10th.

W. M. Horsfall, electrical engineer, 7, Redcross Street, Liverpool.—Last day for receiving proofs for dividend June 29th. Trustee, Mr. J. Allcorn, Government Buildings, Victoria Street, Liverpool.

Company Liquidations

Kinson Electrical Co., Ltd., 9, Brunswick Place, City Road, N.—The statutory first meetings of creditors and shareholders were held on June 15th at the Board of Trade Offices, Carey Street, W.C., before Mr. J. Barwick Thompson, Official Receiver. A statement of affairs was submitted, showing total liabilities of £9,642 (ranking £9,521), assets of £1,823, and a deficiency of £7,701 with regard to contributories, the issued capital consisting of three ordinary shares of £1 each. The company's failure was attributed to the restriction on its trading owing to its not being a member of the Radio Wholesalers' Federation and to its having commenced business without working capital. The liquidation was left in the hands of the Official Receiver.

Baxter & Caunter, Ltd.—Mr. A. A. Lough, receiver and manager, informs us that certain difficulties have arisen which make it impossible to conclude the financial arrangements in connection with the scheme of arrangement of the above company. The managing director of the company states that alternative proposals are under consideration involving the formation of a new company to take over the business as a going concern. In the circumstances the scheme of arrangement has been withdrawn.

Taskers of Andover, Ltd.—Particulars of claims by July 26th to Messrs. F. H. Parrott & J. H. Senior, 4, Southampton Row, Kingsway, W.C., liquidators.

Aeonic Wireless Co., Ltd.—Meeting July 8th at the offices of Messrs. Corfield & Cripwell, Balfour House, Finsbury Pavement, E.C., to receive an account of the winding up by the liquidator, Mr. W. A. J. Osborne.

Brown's Dryers Co., Ltd.—A statement of accounts for the period June 2nd to December 1st, 1931, prepared by the liquidator, Mr. G. H. Lawton, 14, Brown Street, Manchester, shows total receipts, after providing £43 for the maintenance of assets, of £197. There was a credit balance of £89.

Ewart Lawson, Ltd.—Meetings July 7th at 16, Regent Street, Barnsley, to receive an account of the winding up by the liquidator, Mr. C. R. Branson.

Darlington Dry Battery Co., Ltd.—Meetings July 7th at 39, Priestgate, Darlington, to receive an account of the winding up by the liquidator, Mr. V. W. Heslop.

The Twickenham and Teddington Electric Supply Co., Ltd.—Winding up voluntarily. Liquidator, Mr. G. Bostock, 21, Ironmonger Lane, E.C.2. Particulars of claims by July 4th to the liquidator.

F. W. Ames, Ltd.—Winding up voluntarily. Liquidator, Mr. R. B. Baggaley.

Sherborne Electric Supply Co., Ltd.—Particulars of claims by July 15th to the liquidator, Mr. H. Fraser, 4, Fenchurch Avenue, E.C.

Private Arrangements

A. E. Webster (trading as the London Electrical Co.), electrical engineer and wireless dealer, 1, Sherborne Lane, 23, College Hill, E.C., and 35, Arch, Great Suffolk Street, S.E.—In response to a circular letter issued by Messrs. W. H. Cork and Co., 19, Eastcheap, E.C., a meeting of creditors was held on June 17th, at the Cannon Street Hotel. The statement of affairs showed ranking liabilities of £13,818, and after allowing £543 for preferential claims, the net assets were £12,043, leaving a deficiency of £1,775. Mr. W. H. Cork said the stock had been valued on the basis of a going concern, and in the event of a forced realisation nothing like £6,295 would be obtained. He added that the primary cause of the present position was the fact that during the last fifteen or twenty years the debtor had sustained serious losses in Stock Exchange transactions. From a business point of view the undertaking had always been a success. He (Mr. Cork) believed that it could be continued profitably, and it ought not to be closed down and the assets forcibly realised. With judicious handling, there should be very little loss, if any, to the creditors; the turnover was still substantial. Mr. E. H. Hawkins, on behalf of a number of the larger creditors, said that they desired that every consideration should be extended to the debtor. They would like the business continued with a committee of inspection, and advantage taken of the services of the debtor. A resolution was unanimously passed confirming the deed of assignment already executed to Mr. W. H. Cork and Mr. E. H. Hawkins, with a committee. A resolution was also passed expressing sympathy with the debtor.

A. E. Haselton and R. Truby (trading as the Star Electrical Co.), wireless and electrical engineers, 357, Edgware Road, London, W.—A meeting of creditors was held on June 14th at the Incorporated Accountants' Hall, W.C., when Mr. Evans, representing the National Electric Supplies Co., Ltd., the principal trade creditor, presided. It was stated that in order to protect the assets a deed of assignment had been executed in favour of Mr. S. Carr, of Messrs. F. E. Anderson & Co., 20, Bedford Row, W.C., as trustee, and a statement of affairs prepared disclosed liabilities of £2,502, of which £2,155 was due to trade and sundry creditors, and total assets of £1,190, leaving a deficiency of £1,312. The deed of assignment was confirmed, and a committee of inspection, consisting of the three principal trade creditors, was appointed.

Electricity Supply

Lighting, Domestic, Power

Armenia.—ELECTRIFICATION SCHEME.—A plan has been completed for the general electrification of the Soviet Republic of Armenia, and by 1937 the country will have power stations with a total generating capacity of 584,000 kW. The supply is to be distributed as follows: 1,650 million kWh for industry, 175 million kWh for agriculture, and 310 million kWh for private and municipal consumption. All baths, laundries, factory kitchens and bakeries will be operated by electricity, and large apartment houses are to have electric heating. The transport system has been assigned 120 million kWh.

Ashton-under-Lyne. — CHEAPER ELECTRICITY. — The Town Council has reduced its charges for electricity as follows:—Ordinary lighting, exclusive of rateable value and prepayment tariffs: First 500 kWh per quarter, 4d. per kWh; next 500 kWh, 3¾d.; next 1,000 kWh, 3½d.; next 3,000 kWh, 3d.; next 5,000 kWh, 2½d.; over 10,000 kWh, 2d., less a discount of 2½ per cent. for prompt payment of accounts. Heating: 1d. per kWh. Ordinary power: First 250 kWh per quarter, 1½d. per kWh; next 250 kWh, 1¼d.; next 500 kWh, 1d.; next 1,500 kWh, 0.9d.; next 2,500 kWh, 0.8d.; next 15,000 kWh, 0.7d.; over 20,000 kWh, 0.6d. For a 24-hour load the charge for electricity consumed during the night is to be subject to a discount of 20 per cent.

Australia.—A QUEENSLAND SCHEME APPROVED.—Mr. O. J. Moore, the Commissioner who has inquired into the Clarence River County Council's application for sanction to a loan of £191,000 for extending its electricity undertaking, has reported in favour of the application. The present proposal is only sufficient to complete part of a comprehensive scheme which is estimated to cost £550,000.

SPECIAL METERS FOR REDUCING ARREARS.—The Footscray (Victoria) Town Council is to try a novel experiment for reducing arrears of electricity consumers' accounts. It is proposed to install special meters adjusted so that such consumers will be overcharged 4d. in each 9d. This is regarded as preferable to taking legal action for recovery of the arrears. Those who refuse permission for the installation of the new type of meter may have their electricity supply disconnected.

Barrow.—YEAR'S WORKING.—Last year the Electricity Department increased its sales of electricity by two million kWh and the number of consumers by over 1,000. A gratifying feature of the year's working was the receipts from lighting and domestic heating supplies, which rose by £4,379.

Bedford.—CHEAPER ELECTRICITY.—The Electricity Committee recommends tariff revisions representing concessions of £3,230 per annum. The revision of the power tariff is also under consideration.

EXTENSIONS.—A supply is to be given to the London Road Estate at a cost of £1,350.

Bo'ness.—EXTENSIONS.—The Town Council is to proceed with a scheme for the extension of the electricity supply at a cost of £2,900.

Bridport.—CHEAPER ELECTRICITY.—The Town Council has decided to reduce the lighting flat rate in the borough by a 1d. per kWh.

Bury St. Edmund's.—SHOWROOM PROPOSAL.—The Town Council has appointed a committee to consider the opening of an electrical showroom.

Canada.—ELECTRICAL OUTPUT IN 1931.—The output of central stations during 1931 amounted to 16,610,000,000 kWh, including an estimate of 218,000,000 kWh for small stations which do not report monthly, according to a report issued by the Dominion Bureau of Statistics. The large stations, generating more than 98 per cent. of the total, reported a total output of 16,391,510,000 kWh—16,078,653,000 kWh from water power and 312,857,000 kWh from thermal stations.

EXTENSIONS IN NEW BRUNSWICK.—The New Brunswick Electric Power Commission is preparing to extend its transmission lines through Northumberland County, at an estimated expenditure of $750,000.

Chester.—TARIFF ALTERATIONS.—The following alterations in the fixed charges under the tariffs, based on rateable value, are recommended: Up to £150 rateable value, no change; a rebate of 25 per cent. on the next £50; a rebate of 50 per cent. on the next £50; and a rebate of 75 per cent. on the next £50. It is also proposed to extend the scale of discounts (which now operate up to 40,000 kWh a year) to 80,000 kWh a year, and to abolish meter rents.

Croydon.—MAINS EXTENSIONS.—The Electricity Committee is to extend mains at cost of £2,669, and a supply is to be given to the Woodside Estate where fifty tenants wish to have electricity under the weekly rental wiring scheme.

Darwen.—YEAR'S WORKING.—Darwen's electricity undertaking shows a profit of £3,904 for 1931-2, as against £3,263 in the previous year. In the past eleven years the undertaking has aided the rates to the extent of £18,304. New consumers numbered 337, and the energy sold for all purposes amounted to 4,915,616 kWh, an increase of 2.37 per cent., in spite of a decline of 1.43 per cent. in industrial consumption.

Derby.—ASSISTED WIRING.—An assisted wiring scheme costing £10,000 is proposed by the Electricity Committee.

Dorchester.—REDUCED CHARGES.—The Town Council has made the following reductions in charges for electricity:—Lighting: From 7½d. to 7d. per kWh, with the following sliding scale: First 2,500 kWh per annum, 7d. per kWh; next 2,500 kWh, 6d.; next 2,500 kWh, 5½d.; beyond, 5d. Power, heating, and cooking: 2d. per kWh. Two-part tariff for shops and houses: A standing charge of £10 per kW of demand, with a minimum demand of 3 kW, and a "unit" charge of 1½d. Domestic tariff: 1s. 4d. per 10 sq. ft. up to 1,000 sq. ft., and 1s. over 1,000 sq. ft., with a minimum charge of £3 per annum, plus 1d. per kWh.

Ealing.—LOAN SANCTIONED.—Sanction has been received to the borrowing by the Town Council of £10,000 for mains work in connection with the three-phase scheme. The engineer has also been authorised to obtain a spare transformer and voltage regulator in connection with the scheme.

East Ham.—LOANS SANCTIONED.—The Town Council has received sanction to loans of £5,144 for feeders and equipment, and £2,226 for changing over from d.c. to a.c.

Glasgow.—A GARAGE INSTALLATION.—The Cleansing Committee is to install electrical equipment at the Govan garage extension at a cost of £800.

MAINS EXTENSIONS.—The Electricity Committee is to lay distributing mains at a cost of £883.

Great Yarmouth.—LOANS.—The Electricity Committee is to apply for sanction to loans of £20,000 for mains and services, £5,000 for domestic apparatus, and £5,000 for wiring installations.

REDUCED MINIMUM CHARGES.—The minimum guarantee for consumers in the borough has been reduced to 30s. per annum.

Herne Bay.—UNDERGROUND CABLES.—The Herne Bay and District Electricity Supply Co., Ltd., has informed the Blean Rural District of its intention to lay underground cables at Herne, where hitherto overhead lines have been in use by Major Prescott Westcar, the undertaker of the supply.

Heywood.—YEAR'S WORKING.—There was a profit of £3,116 on the Corporation electricity undertaking for the past year, as compared with £2,473 in 1930-31.

Holyhead.—BULK SUPPLY SCHEME.—In connection with the Council's application to borrow £23,000 for the purpose of securing a bulk supply from the North Wales Power Co. and for changing over the local supply system to a.c., the Electricity Commissioners state that they will not support the scheme if there is any likelihood of its becoming a burden on the ratepayers.

Hythe (Kent).—ELECTRICITY FOR PALMARSH ESTATE.—The Folkestone Electricity Supply Co., Ltd., has applied to the Town Council for permission to lay a h.p. cable to give a supply of electricity to the Palmarsh Estate, with a view to future extension into Romney Marsh.

Ipswich.—POWER CHARGES.—Reductions involving a concession of over £6,000 a year are to be made to power consumers.

BULK SUPPLY TO TODMORDEN.—An agreement has been signed for a bulk supply to Todmorden.

YEAR'S WORKING.—There was a net profit of £8,488 on the operation of the electricity undertaking during the past year.

Japan.—HYDRO-ELECTRIC SCHEME FOR FORMOSA.—After discussions lasting eleven years the scheme for the construction of a 100,000-kW hydro-electric plant on Lake Jitsugetsutan, in the island of Taiwan (Formosa), now seems about to become a reality, and construction contracts have recently been placed. The plant will be the largest in the Far East, and the

Municipal Supply Undertakings' Results in 1931-32

Town.	Engineer.	Total Revenue.		Working Expenditure.		Net Profit or Loss.		Sales of Electricity.	
		1930-31.	1931-32.	1930-31.	1931-32.	1930-31.	1931-32.	1930-31.	1931-32.
		£	£	£	£	£	£	kWh.	kWh.
Barnstaple	J. W. Hadfield	20,211	21,195	10,578	10,009	+ 2,616	+ 4,982	889,543	1,032,572
Blackburn	W. A. Royle	197,043	206,687	69,112	67,897	− 5,874	+ 6,998	24,481,070	26,484,089
Bolton	H. E. Annett	291,532	310,938	144,019	149,979	+29,509	+47,670	59,439,790	66,610,422
Burton	T. Hall	125,457	129,993	57,840	64,958	+ 6,206	+ 8,620	22,796,181	23,529,675
Chester	S. E. Britton	95,844	101,573	55,270	62,510	+10,344	+ 3,633	15,063,562	16,487,809
Dover	R. C Harper	50,395	51,116	28,513	28,513	+ 3,924	+ 4,888	3,630,112	3,684,911
Guildford	W. E. Affleck	94,682	82,774	31,685	37,372	+10,296	+11,887	8,041,927	12,610,801
Hoylake	C. J. Turner	—	38,366	—	26,733	—	+ 951	—	3,191,903
Manchester	H. C. Lamb	1,796,892	1,864,603	1,127,998	1,157,783	+16,672	+43,331	377,724,555	398,565,408
St. Helens	W. S. Johnston	142,463	145,575	—	—	+20,466	+26,498	37,900,000	37,300,000
Seaham Harbour	H. Adam	12,647	16,464	6,589	7,868	+ 267	+ 1,516	673,457	846,977

energy generated will be used to supply the needs of all parts of the island. When demand warrants another station will be erected below the site of the present project.

Kettering.—OVERHEAD LINES.—The Electricity Committee has obtained permission to erect overhead lines to supply the parishes of Wilsbarton and Stoke Albany.

London.—TRANSFER OF UNDERTAKING.—The negotiations between the London and Home Counties Joint Electricity Authority and the South Metropolitan Electric Tramways & Lighting Co., Ltd., for the acquisition by the Authority of the company's electric lighting and power undertaking have now been completed, and the transfer of the undertaking will be made on July 1st.

BATTERSEA.—The Electricity Committee is to provide services to ninety-seven premises at a cost of £871. Sanction has been received to a loan of £38,000 for the purchase of the Lombard Street site for future extensions of the undertaking.

FULHAM.—The Borough Council is to apply for sanction to loans of £15,000 for services, £10,000 for meters, and £20,000 for the rental wiring scheme. A new sub-station is to be erected in Beaconsfield Road at an estimated cost of £3,253, mains are to be laid along Ranleigh Gardens to supply two large consumers, at an estimated cost of £411.

HAMMERSMITH.—The Electricity Committee recommends the extension of mains at a cost of £440, and the replacement of feeder switches at sub-stations at a cost of £1,217.

It is proposed to abolish the existing tariff for shops and substitute the two following alternative rates: (*a*) A fixed charge of £10 per kW of lighting installed per annum, plus ½d. per kWh. (*b*) General and window lighting between 7 a.m. and 7 p.m., standard lighting rate of 3d. per kWh; window lighting between 7 p.m. and 7 a.m., 1d. per kWh.

STOKE NEWINGTON.—The accounts of the Borough Council's electricity undertaking for the past year show a net surplus of £7,155.

Lowestoft.—YEAR'S WORKING.—Last year the Corporation electricity undertaking made a net profit of £1,606, in spite of reductions in charges amounting to approximately £8,000. The total revenue was £48,427, and the working expenditure £34,419.

Marlborough.—CHEAPER ELECTRICITY.—The Town Council has made the following reductions in charges:—Lighting: From 8½d. to 8d. per kWh. Power: From 3d. to 2½d. per kWh. Contract rate: From 2d. to 1½d. per kWh. Slot meters: A rebate of 2d. per kWh for all energy in excess of 12 kWh.

STREET LIGHTING EXPERIMENTS.—The Electricity Committee is to experiment with a number of overhead lamps for lighting the Barn Street Road Junction.

Newtown (Mon).—A SUPPLY SOON.—The North Wales Power Co., Ltd., hopes to have a supply of electricity available for the town within six months.

North-East Coast.—PROGRESS OF GRID SCHEME.—The work of linking-up the North-East Coast under the grid scheme has been completed, and only details in connection with certain stations have to be dealt with before the £9,000,000 reorganisation comes into operation. Mr. D. M. Buist, engineer-in-charge of the scheme, has stated that all consumers' equipment will be ready for the change-over early next year. The scheme was commenced in January, 1931, and to-day 72 miles of the system are in operation. Bridlington is being supplied by Scarborough Corporation; Darlington is supplying Northallerton, Richmond, and Catterick; while York is the source of Malton's supply. The Dunston power station is expected to be generating before the end of the year. The scheme will provide for the electrical requirements of about 3,000,000 people, and last year 787,440,000 kWh was generated in the area. The existing 19 generating stations will be replaced by six generating stations and 17 sub-stations.

Northern Ireland.—BELFAST.—The Electricity Committee is applying for sanction to a loan of £37,000 for cables and rotary converting plant for the tramway system.

Palestine. — HYDRO-ELECTRIC STATION OPENED. — The first hydro-electric station on the Jordan, constructed for the Palestine Electric Corporation, was officially opened recently by Lt.-Gen. Sir Arthur Wauchope, High Commissioner for Palestine and Transjordania. The plant is at present capable of an output of 12,000,000 kWh a year and will ultimately supply 65,000,000 kWh.

Retford.—EXTENSIONS.—The Town Council has decided to extend the supply of electricity to the villages of Ranskill and Torworth.

OFFER TO PURCHASE UNDERTAKING.—At a recent meeting of the Council the Mayor said that an offer had been made for the sale of the undertaking at a price which would more than repay the Council's outlay; the Electricity Committee considered, however, that this would not be in the interests of the town.

Sleaford.—A GRID SUPPLY.—The Urban District Council has prepared a scheme to take a bulk supply from the grid, and for an eventual change-over at an estimated cost of £25,000. A portion of the work, costing £10,000, is to be carried out before the winter.

Southend-on-Sea.—YEAR'S WORKING.—There was a surplus of £30,024 on the electricity undertaking last year.

Stafford.—YEAR'S WORKING.—The Electricity Department reports a gross profit of £12,727 for the past year on the electricity undertaking, a decrease of £209 as compared with the preceding year's figure. The net profit was £3,249.

Steyning.—EXTENSIONS.—The Steyning Electric Light Co., Ltd., is to commence the laying of mains at West Chiltington, Storrington, and Sullington.

Stone.—YEAR'S WORKING.—The Urban District Council reports a surplus of £294 on the electricity undertaking for the past year.

Wallingford.—PUBLIC LIGHTING.—The Rural District Council has sealed an agreement with the Wessex Electricity Co. for public lighting at East Hagbourne for ten years.

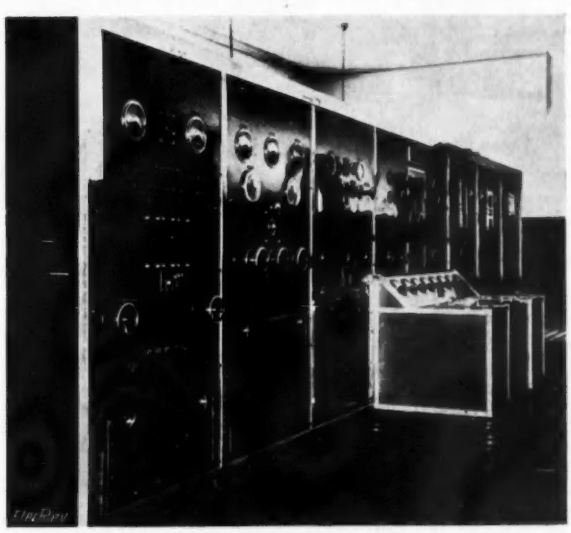
Walsall.—SUPPLY IMPROVEMENTS.—A scheme costing £9,350 is to be carried out for alteration of the e.h.p. ring main system and the modernisation of switchgear.

Warrington.—YEAR'S WORKING.—The accounts of the Electricity Department for the past year show a net profit of £13,588, as compared with £19,865 in the previous year.

Woking.—CHEAPER PREPAYMENT SUPPLIES.—The Woking Electric Supply Co., Ltd., is reducing its charges through prepayment meters from 8d. to 7d. per kWh.

Traction

Australia.—TROLLEY BUS EXPERIMENTS.—The Tramways Trust which controls and operates the tramways in Adelaide has had a trolley bus constructed for experimental purposes. The design is based on that of similar vehicles in use in this country, the vehicle consisting of an old bus from which the engine, gear box, and clutch had been removed, and replaced by an 80-h.p. electric motor. The vehicle runs on pneumatic tyres, weighs 7 tons unloaded, and will seat twenty-three passengers. Power is obtained from overhead wires by means of two trolley poles, allowing a 13-ft. 6-in. deviation, the negative return to earth being by a trailing shoe instead of the usual negative trolley wire.



The 20-kW Marconi transmitter at the recently opened Florence broadcasting station

Blackburn.—YEAR'S WORKING.—In our issue of June 10th we stated that there was a deficiency on the tramways of £2,709. This deficiency was upon the omnibus account, and not that of the tramways, the latter account at the present time having a surplus of £4,435, and a permanent-way renewals fund of £4,353.

Dover.—TROLLEY BUSES.—A report on the question of substituting trolley buses for trams has been prepared by the tramway manager.

Huddersfield.—RELAYING OF TRACK.—The Town Council is to relay the tram track in New Hey Road and Westbourne Road.

Japan.—RAILWAY ELECTRIFICATION.—The I.G.R. is to electrify its Yokohama line from Higashi-Kanagawa to Hachioji, the section between Higashi-Kanagawa and Haramachida being undertaken first. A proposal to extend the Maihara-Uyeno line for a distance of ten miles is also being considered by the Omi Railway Co.

L.M.S. Railway.—ELECTRIC TRAIN OVERHAUL.—New methods overhauling the control apparatus of electric locomotives and motor coaches have recently been introduced on the L.M.S. Railway by Lt.-Col. Cortez-Leigh, the company's chief electrical engineer. The prevailing practice of installing the

control apparatus on the unit principle, *viz.*, fitting each individual component on to a frame forming a part of the coach structure, necessitates the provision of a number of spare motor cars to take the place of defective cars sent to the repair depôt. Under the new system the whole of the apparatus, whether to control two or more motors, is first mounted in the shop on a specially designed frame or frames. Each frame is then conveyed by crane to where the coach stands and is placed on an adjustable platform. The apparatus frame, which is fitted with wheels, is then rolled through suitable longitudinal openings provided in the sides of the coach, on to channel-section rails fixed transversely in the compartment and forming part of the coach structure. When the frame is in position it is only necessary to bolt it to the channels. The main cables, motor leads, etc., from the underframe of the coach are brought up through the floor to a terminal board attached to the frame. All the control wires are similarly brought to a multi-point plug receptacle fixed on the frame; thus the complete apparatus on a car can be changed in an hour or so, compared with two or three days under the old method, and this enables the spare cars to be used for augmenting the service. A further innovation is the provision of a few motor bogies fitted complete with motors, so that in the event of a car being taken out of service for a motor defect it can be run into the depôt during the slack periods, when the bogie, or bogies, can be changed immediately and the cars returned to service at once. The main switchboard can also be removed in one piece, and the motor-driven air compressor can quickly be replaced.

Advertising the telephone: The Postmaster-General (Sir Kingsley Wood) giving a send-off to a fleet of motor cycles, each bearing a large model telephone, which is to tour London and the suburbs

London.—TUBE COLLISION INQUIRY.—An inquiry was held last week by Col. A. H. C. Trench, Inspecting Officer of Railways, into the collision between two trains on the Piccadilly line at Hammersmith on June 10th. Giving evidence, Mr. H. Edwards, motorman of one of the trains, said he was proceeding towards Hammersmith when he got a "trip" (an automatic application of brakes), but thought it was a failure, as he had heard that there had been a number of defective "trips" since the new working at Hammersmith. He reset the "trip" and, after proceeding slowly for a few yards, his train was struck in the back by another. Mr. G. H. Thomas, superintendent of the line, admitted that there had been a few "trip" failures since the new work, but they had all been on the safety side. Col. Trench said that the "trip" was the most important safeguard there was on the Underground, and it must be regarded as sacred. Nobody was injured, and the damage to the train was exceedingly slight.

Nelson.—THE TRANSPORT QUESTION.—The tramways traffic superintendent is to report on the question of substituting buses for trams on Scotland Road route.

Newcastle-upon-Tyne.—OPPOSITION TO RELIEF OF RATES.—Labour members of the Corporation have decided to oppose the practice of taking money from the profits of the tramway undertaking for the relief of rates. They state that, while there is a dept of £850,000 on the tramway system, over £250,000 has been taken from the annual profits to keep down the rates. They also contend that all surplus earnings should be devoted to lowering fares, improving the services, and abolishing casual labour and short time among the employés.

Norwich.—CORPORATION TO PURCHASE TRAMWAYS?—The Corporation is negotiating with the Norwich Electric Tramways Co. for the purchase of the tramway and omnibus undertaking. The purchase price mentioned is £175,000.

Southern Railway.—PROGRESS OF ELECTRIFICATION.—The date of the opening of the first half of the Southern Railway's London-Brighton electrification scheme has been fixed for July 17th. The line has now been electrified as far as Three Bridges, and it is hoped to have the full service from London to Brighton and Worthing in operation by next March.

Communications

Australia.—PROPOSED TELEPHONE TO TASMANIA.—A deputation of Tasmanian members of the Federal Parliament recently waited upon the Postmaster-General to urge the provision of telephone communication between Tasmania and the mainland. The Postmaster-General promised to ascertain from the Cabinet whether action could be taken in the near future.

East Africa.—TELEPHONY.—The annual report of the Kenya and Uganda Post and Telegraph Department shows that progress was well maintained in 1931, despite the prevailing commercial depression. At the end of the year 2,655 telephone instruments were in use in Kenya and 802 in Uganda, increases of 252 and 25 respectively over 1930, and of no fewer than 1,089 and 237 over 1927. Nairobi had 742 subscribers, Mombassa 285, Kampala 250, Entebbe 92, Nakuru 62, and Eldoret 59. Telephones attached to exchange lines numbered 1,427 in Kenya and 487 in Uganda. The new automatic exchange at Nairobi, the installed capacity of which is 1,000 lines, and the ultimate capacity 2,000 lines, is described as being very popular and efficient.

NEW WIRELESS FACILITIES.—The report states that the number of wireless receiving licences issued during the year was 418, as against 419 in 1930. Transmission on 350 metres from the Nairobi broadcasting station was satisfactory, but reception on the short wave of 49.5 metres was not consistently steady in certain areas. During the ten months the Mombassa Coast wireless station was operated by the Department it handled 2,972 radiograms, of which 1,724 were exchanged with ships at sea. Special wireless facilities at Nairobi and Kampala in connection with the England-South Africa air service were established during the year. At Nairobi these facilities are provided under an agreement with Imperial and International Communications, Ltd.

Facilities at Kampala are provided by means of a new long- and short-wave station, which was completed and brought into service in September. This station is operated and maintained departmentally, and, though primarily intended for air-service work, it can, if desired, be utilised for internal wireless services and for general communications with the Sudan and the Belgian Congo. Through this station Uganda is now in wireless communication with all the neighbouring territories.

Egypt.—RADIO-TELEPHONY.—The British Postmaster-General announces that a public radio-telephone service between this country and Egypt was opened on June 22nd. Communication is available to and from all parts of Great Britain and Northern Ireland, but the service in Egypt will be restricted to Cairo and Alexandria.

BROADCASTING.—Marconi's Wireless Telegraph Co., Ltd., has reached an agreement with the Ministry of Communications to take over the development of Egyptian broadcasting. The company will, on behalf of the Egyptian Government, build a broadcasting station at a cost of £30,000, and will undertake all the work connected with broadcasting. The company will receive an agreed percentage of all licence fees.—*Reuter* (Cairo).

Great Britain.—RADIO EXCHANGES.—The Bromley (Kent) Town Council has decided not to allow radio relay exchanges to be established in the borough; eight applications have been made.

The Whitby Urban Council is to allow Barratt Bros. to establish a relay service.

Brierley Hill Urban Council is considering an application from a relaying concern.

The Glossop Corporation has granted permission for a radio relay service to be started in the borough.

The Gravesend Radio Central Exchange, Ltd., is not to be allowed to wire the Denton Estate.

Irish Free State.—NEW RADIO STATION.—The new high-power broadcasting station commenced to transmit, temporarily, this week. The wavelength used is that of the Dublin station, namely, 413 metres, 725 kc, and the carrier power is 60 kW.

London.—TELEVISION.—The present series of television transmissions is to cease and in its place the B.B.C. is to commence about the middle of July regular transmission by the Baird process at 11 p.m. four times per week. The new series will continue until March, 1934, and the programmes hitherto provided by the Baird Co. will be taken over and adapted by the B.B.C. The Baird Co. will concentrate on research and the improvement of reception equipment.

POLICE COMMUNICATION.—The possibilities of telegraphy, teleprinter services, telephony, and radio for the assistance of the police and fire brigades were explained in a paper which Mr. L. Simon, director of telegraphs and telephones, G.P.O., read at the conference of the Chief Constables' Association in London last week.

North Africa.—TELEPHONY.—Telephone communication is to be made available for public use before the end of June. *The Times* reports that the overhead lines between Algiers and Oran have been replaced by a new underground cable, connecting with the overhead circuit joining Oran to Rabat.

Contract Information

When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisement is given in parentheses below

Contracts Open

Australia.—SYDNEY.—October 17th. City Council. Four three-circuit power transformers for Pyrmont power station. (A.X. 11378.)*

MELBOURNE.—August 1st. Victorian Electricity Commission. Triple braided copper aerial cable. (A.X. 11376.)*

August 30th. Posts and Telegraph Department. Switchboard cords. (A.X. 11377.)*

Brighton.—July 14th. Electricity Department. 30,000-kW turbo-alternator, with condensing plant and auxiliaries, and three steam-raising units, combustion equipment, &c. (See this issue.)

Bristol.—July 7th. Electricity Department. Reactors. (See this issue.)

Colombia.—CALI.—Electric passenger lift for the National Government Palace. (A.X. 11370.)*

Denholme (YORKS).—Industrial Co-operative Society, Ltd. Installation of electric lighting at central premises, School Street. Secretary (deposit 10s.).

India.—SIMLA.—July 11th. India Stores Department. 31,000 "8-type" inert cells. Director-General, India Stores Department, Belvedere Road, S.E.1 (fee 5s.).

Manchester.—June 27th. Electricity Department. Automatic, booster transformer, voltage-variation equipments for 6,600-V transformers. (June 10th.)

Meltham.—July 1st. Urban District Council. Wiring for lighting installation in 120 Council houses at Broadlands. Mr. T. S. Hayton, U.D.C. clerk, Town Hall, Meltham.

Morley.—June 25th. Education Committee. Electric motors, &c., for new textile department at the Technical Institute. Mr. H. Bolan, secretary for technical education, Town Hall.

Newcastle-under-Lyme.—June 29th. Corporation. 100-kVA transformer, e.h.p. switch cubicles, and l.p. switchgear for Millhouse sub-station. Mr. W. C. C. Hawtayne, 9, Queen Street Place, E.C.4 (deposit £1 1s.).

Newhaven (EDINBURGH).—Electric heating installation at the Free Fisherman Hall. Mr. R. L. Rutherford, 16, Lindsay Road, Leith.

New Zealand.—WELLINGTON.—July 27th. Post and Telegraph Department. Secondary cells. (A.X. 11381.)*

August 17th. Instrument cords. (A.X. 11382.)*

South Africa.—JOHANNESBURG.—July 15th. Government Supplies Board. Small motor generator and accumulators. (A.X. 11375.)*

Swansea.—August 3rd. Electricity Department. Generating plant for Tir John North power station. (June 17th.)

West Riding.—June 27th. County Council. Electric lighting installation at Drake & Tonsons Girls' New Grammar School, Keighley. Education officer, County Hall, Wakefield.

June 25th. Automatic traffic signal installations at Pudsey, Drighlington, Gildersome, Tingley, Knaresborough, Whitwood, Honley, and Micklefield. County surveyor, County Hall, Wakefield (deposit £1).

July 11th. Lighting installation at Hoyland Kirk Balk School. Education officer.

Contracts Closed

Bedford.—Electricity Committee. Recommended. Boiler feed pump (£380).—W. H. Allen, Sons & Co., Ltd. Wiring premises for one year under assisted scheme.—E. L. Gough. Electric lamps for 12 months.—Cryselco, Ltd.

Bootle.—Highways Committee. Recommended. Three batteries for electric vehicles (£558).—Chloride Electrical Storage Co., Ltd.

Croydon.—Assistance Committee. Recommended. Electric light installation at children's home, London Road (£98).—A. E. Cook.

Electricity Committee. Recommended. Three-phase outside type transformer (£143).—British Electric Transformer Co., Ltd. Transformer switch (£155) and transformer panel (£155).—A. Reyrolle & Co., Ltd. Repairs to cooling towers (£679).—Premier Cooler & Engineering Co., Ltd.

Government Contracts.—The following contracts were placed by the various Government Departments during May:—

ADMIRALTY (CONTRACT AND PURCHASE DEPARTMENT).

E.h.p. circuit breakers.—A. Reyrolle & Co.

Electric cable.—Derby Cables; G.E.C.; Hackbridge Cable Co.; Johnson & Phillips; Metropolitan Electric Cable & Construction Co.

Electro-magnetic friction type clutch.—Power Plant Co.

Reblading of turbo-alternator rotor.—Fraser & Chalmers.

Switches, &c.—Whipp & Bourne; Bertram Thomas.

Switchboards.—Whipp & Bourne.

Wireless valves.—G.E.C.

Wire, brass, copper and phosphor bronze.—T. Bolton & Sons; I.C.I. Metals; D. F. Tayler & Co.; Baxendale & Co.

WAR OFFICE.

Portable secondary batteries.—Pritchett & Gold and E.P.S. Co.

Electric cable.—Siemens Bros. & Co.; G.E.C.

Lechanché cells.—Siemens Bros. & Co.

AIR MINISTRY.

Magnetos and magneto spares for aircraft engines.—B.T.-H. Co.

CROWN AGENTS FOR THE COLONIES.

Cable.—Standard Telephones & Cables; St. Helens Cable & Rubber Co.

Switchgear.—Ferguson, Pailin.

Telephone apparatus.—G.E.C.

Turbine blade system.—Brush Electrical Engineering Co.

POST OFFICE.

Telephonic apparatus.—Automatic Electric Co.; Ericsson Telephones; G.E.C.; Siemens Bros.; Standard Telephones & Cables; Telephone Mfg. Co. (1929).

Testing and protective apparatus.—G.E.C.; Gillett & Johnston; Phœnix Telephone & Elec. Wks.; Telephone Mfg. Co.

Wireless apparatus.—G.E.C.

Cable.—B.I. Cables; Concordia Electric Wire Co.; Standard Telephones & Cables.

Secondary cells.—Accumulators of Woking (1928); Britannia Batteries.

Loading coils.—Siemens Bros.

Telephone cords.—Reliance Electrical Wire Co.

Electric lighting fittings.—Venner Time Switches.

Telephone lamps.—Edison Swan Electric Co.; G.E.C.

Modifications to electric trucks.—Greenwood & Batley.

Recoating cases with ebonite.—I.R.G.P. & Telegraph Wks. Co.

Rectifiers.—Ediswan; Westinghouse Brake & Saxby Signal Co.

Insulating tape.—Connollys (Blackley), Ltd.

Cable manufacture, supply, drawing-in and jointing, Derby-Leeds (Derby-Barnsley section).—United Telephone Cables, Ltd.

Submarine cable, Portsmouth-Gosport (1932).—Siemens Bros.

Electric lift, G.P.O. (North), E.C.—Wm. Wadsworth & Sons.

Telephone exchange equipment.—Wandsworth & District Gas Co.; Whitehall second unit (Gerrard).—Siemens Bros. Sub-contractors for Whitehall: Hart Accumulator Co. for batteries; English Electric Co. for charging machines. London trunk telephone exchange (1st floor, 3rd floor annexe and 3rd floor main), Hounslow.—Standard Telephones & Cables. Mayfair, Regent, Grosvenor and Langham (London, W.), Beck & Pollitzer (London, S.E.).—Automatic Electric Co. Flaxman (S.W.).—G.E.C.

Telephone repeater equipment.—Portsmouth: Haslam & Newton. Sub-contractors: Alton Battery Co. for "A" and "C" batteries; Britannia Batteries for "B" batteries. Belfast.—Standard Telephones & Cables. Sub-contractors: D.P. Battery Co. for "A" batteries; Britannia Batteries for "B" batteries; Electric Construction Co. for charging machines.

London.—ISLINGTON.—Works Committee. Recommended. Three batteries for electric vehicles (£357).—Britannia Batteries, Ltd.

L.C.C. Education Committee. Recommended. Installation of fire alarm internal telephone system at Anerley residential school (£638).—Buchanan & Curwen.

HACKNEY.—Works Committee. Recommended. Two batteries for electric vehicles (£443).—Chloride Electrical Storage Co., Ltd.

HAMMERSMITH.—Electricity Committee. Recommended. Replacing feeder switches on the main switchboard with switches with a rupturing capacity of 250,000 kVA.—Ferguson, Pailin (£1,624); General Electric Co., Ltd. (£475). Three generator switches of 250,000 kVA rupturing capacity (£402).—Ferguson, Pailin, Ltd. Transformers (£2,463).—British Electric Transformer Co., Ltd. Cable (£95).—Edison Swan Electric Co., Ltd.

Lowestoft.—Town Council. Accepted. Installation of four sets of traffic signals (£139).—Laurence, Scott & Electromotors, Ltd.

Malvern.—Urban District Council. Accepted. Rewiring the Priory Small Hall for electric lighting.—A. F. Evans, Ltd.

Portland.—Electricity Committee. Accepted. Cables (£1,170).—Pirelli-General Cable Works, Ltd. Switchgear (£609).—Crompton Parkinson, Ltd. Transformer (£129).—Foster Engineering Co., Ltd.

Seaham Harbour.—Electricity Committee. Accepted. Cable (£1,767).—W. T. Henley's Telegraph Works Co., Ltd.

Weymouth.—Town Council. Accepted. Cables (£2,480).—Johnson & Phillips, Ltd.

Whitby.—Urban District Council. Accepted. Cable (£266).—Callender's Cable and Construction Co., Ltd.

Yarmouth.—Electricity Committee. Accepted. Additional pumping plant at electricity works (£835).—Mather & Platt.

Our Service Department

Inquiries must be accompanied by a stamped addressed envelope.

We shall be glad to learn the names and addresses of the makers of the following:—

Small domestic electrically-operated hydro-extractors.

ALVAS searchlight.

WATKIN dimming switch.

EVERLITE oven.

GROSVENOR cables.

Forthcoming Events

Electrical Contractors' Association.—June 28th-30th. Southport. Annual conference.

Institution of Electrical Engineers.—Thursday, June 30th. Natural History Museum, Cromwell Road, S.W. 8.30 p.m. Conversazione.

Overhead Lines Association.—July 1st. Chesham. Summer meeting.

Diesel Engine Users' Association.—Saturday, July 2nd. Summer meeting. Excursion to Southampton, visit to M.V. *Asturias* and presidential address by Mr. C. M. Mayson.

Electrical Power Engineers' Association (*London Technical Group*).—Saturday, July 2nd. Visit to the works of the Hackbridge Electric Construction Co., Ltd., and the Hewittic Electric Co., Ltd., Hersham, Walton-on-Thames.

Notes

The E.A.W. Scottish Summer School

The Glasgow Branch of the Electrical Association for Women is arranging, in conjunction with the British Electrical Development Association, the Scottish Lighting Service Bureau, and the Glasgow College of Domestic Science, for a summer school in the College, Park Drive, Glasgow. "Electrical Housecraft for Women" is the subject of the course, and the school will last from July 4th to 8th. Lady Belhaven and Stenton will give the opening address, and among the topics for discussion will be: "Women's Interest in Electricity," "Electricity: Its Application in the Home," and colour lighting, home lighting, the electric cooker, electric vacuum cleaning, refrigeration, laundry work, and electrical equipment for nursing homes. On the closing day there will be a general discussion on the lessons, when a series of lectures will be given.

E.P.E.A. Annual Dinner

The fourteenth annual dinner of the Southern Division of the Electrical Power Engineers' Association will be held in the King's Hall, Holborn Restaurant, on October 1st. Details may be obtained from Mr. F. H. Smethurst, hon. sec., Southern Division, "Tremorvah," Lynton Road South, Gravesend, Kent (telephone: Gravesend 1277).

Educational

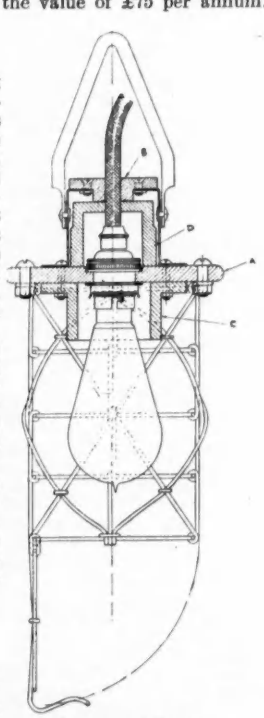
LOUGHBOROUGH COLLEGE.—The calendar for the 1932-33 Session containing a full syllabus is now available. The electrical engineering section contains information on the courses of study, laboratories and equipment. The session commences on September 20th.

British Empire Scholarships in the Faculty of Engineering, Loughborough College, are tenable for the full period of the diploma course. The Governors have approved the following awards for 1932-33:—J. C. Heath (Wellingborough School); K. W. Maxwell (Tewkesbury Grammar School); J. Hollingshead (Bedford Modern School); E. L. Gosling (Leyton County High School); and R. H. Cousins (Eltham College). These scholarships are open to all British subjects resident in any part of the Empire, and are of the value of £75 per annum.

A Heat-resisting Hand Lamp

Hand lamps for use in brick kilns have to withstand considerable stress from heat, and it is to meet these conditions that the London Brick Co. & Forders, Ltd., is manufacturing a special heat-resisting lamp. It is composed entirely of materials not affected by heat, and all parts which are easily replaceable are designed to have a very good mechanical strength to withstand any rough treatment when in use.

As shown in the diagram, the parts are assembled on a moulded disc. The lampholder and lampcap are completely shrouded by heat-resisting material with good insulating properties, hence there is no necessity to earth these parts. Tests at the factory have shown the lamp to be satisfactory, and it is accepted by the factory department of the Home Office under the Electricity Regulations. Circular twin cargo flexible cord is provided.



A diagram of the lamp

Future of South African Tramways

At the recent annual conference of the Association of Road Passenger Transport Officials of South Africa an address on "Municipal Passenger Transport" was given by Mr. J. S. Fotheringham, chairman of the Johannesburg Tramways and Lighting Committee. He said that authorities who intended using tramways in the future must give consideration to improved seating, lighting, ventilation and heating, and reduction of noise. Mr. M. L. Merry, tramways superintendent at Bloemfontein, said that at present in South Africa, with petrol averaging 2s. per gallon in bulk and electricity averaging ¾d. per kWh for traction purposes, the electric trolley bus had an undoubted advantage over the petrol omnibus. Mr. J. A. Bromley, manager of Durban Corporation transport, the outgoing president, declared that tramways must give way to more modern, comfortable and efficient forms of transport.

Electrical Shotfiring Apparatus

The Secretary for Mines announces that the Magnet (1932) low tension exploder, submitted for test by the General Electric Co., Ltd., and the Helsby (1932) low tension exploder, submitted for test by British Insulated Cables, Ltd., have been approved for use in all coal mines to which Part II of the Explosives in Coal Mines Order, 1913, applies.

Swimming Bath Lighting

The Doncaster Corporation's new baths in St. James's Street were opened by the Mayor on June 9th. A feature of the new baths is the swimming hall which is 120 ft. long and 60 ft. wide, with a swimming pool measuring 100 ft. by 40 ft. There are also slipper baths, Turkish baths, a Russian bath, and a sun-ray room.

A novel feature is the lighting of the swimming pool by a series of under-water units arranged in the two long sides of the pool and fitted approximately 6 in. below the water level. The "Holophane" lighting units employed are specially designed for the purpose, the optical system consisting of a 12 in. square prismatic lens behind which is arranged a 500-W class

Under-water lighting in the new Doncaster swimming pool

"B" projector lamp, fitted with a spherical section chromium plated reflector. This method avoids the unpleasant surface reflections from moving water which are obtained when such pools are lighted from overhead.

The "Holophane" lens employed is formed with a series of concentric prisms so cut as to give a suitable divergence to the reflected beam of light, and within a definite range. Either a wide or narrow beam can be given by adjustment of the lamp system to suit the distance and width of throw. The whole of the electrical installation was carried out by the Building & Colliery Supply Co., Ltd., Doncaster, the under-water lighting system being designed and supplied by Holophane, Ltd.

Standards for Train-lighting Accumulators

Following closely on the two British Standard Specifications for portable accumulators and stationary accumulators, respectively, a corresponding specification for train-lighting accumulators (lead-acid type) has now been issued. The position in which such accumulators are installed on the train varies greatly according to the practice of the individual railway companies, with the result that it has not been found possible to standardise a rigid design of battery. The dimensions of a number of the component parts are standardised, however, together with the tolerances and the materials. The chemical purity of the electrolyte is covered, and the method of testing for output fully dealt with. A test for the chemical inertness of moulded composition and ebonite boxes is included. Copies of this Specification (No. 454-1932) may be obtained from the Publications Department, British Standards Institution, 28, Victoria Street, S.W.1, price 2s. 2d., post free.

I.E.E. Golf Competition

The golf competition organised by the Mersey and North Wales (Liverpool) Centre of the Institution of Electrical Engineers on the links of the West Lancashire Club on May 25th resulted in the Benevolent Fund benefiting to the extent of £80.

Remedy—Electric Cookers

We are indebted to the British Electrical Development Association, Inc., for the following extract from the *Journal* of the Manchester Union of Domestic Science Teachers (June, 1932): "We believe a mandate has gone forth in Manchester that all ventilating shafts from gas-cookers have to be carried out into the open air. In the majority of cases at present the shafts, although there, have been allowed to emit their fumes into the rooms. We are deeply indebted to the Education Committee for this improvement and hope that as financial pressure in educational matters becomes easier, hoods will be erected to convey the gases from the *tops* of the cookers away. These gases are equally as injurious as those from the ovens and in factories are compelled by law to be carried away."

Power in Industry

Apt to the use of power in industry is the statement that appears in *Power* regarding the aims of a policy that will permit the highest economy: 1. Making power when it should be made. 2. Buying power when it should be bought. 3. Cheaper power through modern equipment. 4. Easier financing of equipment purchases. 5. Better use of by-product heat and power. 6. Operating methods that save money. 7. Less waste in transmission and application. 8. Prevention of smoke, within reason.

Our Personal Column

Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements

Mr. F. Thursfield, general manager of the Leicestershire and Warwickshire Electric Power Co., who is retiring from the management of the company at the end of the present month, is a graduate of Cambridge University and a member of the Institutions of Civil and Electrical Engineers. He commenced his career with the Electrical Construction Co. under the late Mr. Thomas Parker. While with this company he was sent to look after the accumulator tramways between Birmingham and Bournbrook, and later was employed on the construction and starting up of the Liverpool Overhead Railway. In 1892 he was appointed the first borough electrical engineer of Burnley, and in 1896 the first city electrical engineer of Chester, where he remained until 1904, when he was engaged by Messrs. Preece and Cardew to take charge of the electrification of Devonport Dockyard and other properties of the Admiralty in the Plymouth district. In 1912 he was appointed manager of the Leicestershire & Warwickshire Electric Power Co. to start and develop that undertaking. An existing power station building was equipped with some generating machinery and a supply was provided for the town of Hinckley in the autumn of that year. Development for a time was slow owing to the intervention of the War, but extensions have been fairly rapid since. Mains have been laid throughout the counties of Leicestershire and Warwickshire and supplies are now being provided in over 130 towns and villages. The company has a connected load, including bulk supplies to Nuneaton, Rugby, Leamington, Warwick and Loughborough, of over 85,000 kW, and last year sold 76,000,000 kWh. Mr. Thursfield will retain his seat on the board of this and one or two other companies.

The accompanying illustration shows some of the members of the Transoceanic Aviators' Congress, which recently took place in Rome, at the tomb of the Unknown Soldier. The two prominent figures near the centre of the picture are **Sir Arthur Whitten-Brown** and the Air Minister, General Balbo. Sir

Sir A. Whitten-Brown at the Transoceanic Aviators' Conference, Rome

Arthur, as the surviving aviator of the first Transatlantic flight, was the senior member of the Congress and honoured as such throughout the whole proceedings. He was made Commander of the Order of St. Maurice and St. Lazarus—a very high Italian honour. Sir Arthur, who was with the Metropolitan-Vickers Electrical Co., Ltd., before the War, is now the company's district manager at Swansea.

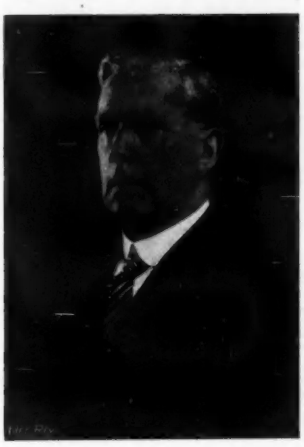
Mr. Matthew Short is retiring from the office of joint secretary of the Newcastle-upon-Tyne Electric Supply Co., Ltd., at the end of this month after 42 years' service. During the last few years, in addition to holding the office of joint secretary, he has acted in a similar capacity to nine associated companies. Besides being on the council of the Incorporated Association of Electric Power Companies, Mr. Short has acted as chairman of the Secretaries' Committee of that Association. He has also served as a member of the North-East Coast Advisory Committee of the Electrical Trades' Benevolent Institution. Mr. Short was recently entertained to dinner in Newcastle by the local directors and chief officials of the company who took the opportunity of making him a presentation as a token of their esteem, and, at the end of this month, he is to receive a further presentation from the company's staff. In recognition of his services on the Secretaries' Committee of the Power Companies' Association, Mr. Short was recently presented with an inscribed silver case.

Mr. A. C. Wynne has severed his connection with the Wandsworth Electrical Manufacturing Co., Ltd., and has commenced business on his own account under the style of Henley Burrowes & Co., at Hudsons Drive, Catteridge, Birmingham.

Mr. B. Gomersall has been appointed a director of the Fuller Electrical & Mfg. Co., Ltd., in association with the Asea Electric, Ltd.

Mr. T. V. Forde, eldest son of Mr. J. A. Forde, A.M.I.E.E., engineer and manager of the Isle of Thanet Electric Tramways and Lighting Co., Ltd., was married at Ramsgate on June 11th to Miss B. M. Holladay, and he was presented by the staff and employés of the company with a collection of cutlery, and by Callender's Cable & Construction Co., Ltd., with a vacuum cleaner.

Prof. Miles Walker, Professor of Electrical Engineering at the Victoria University and at the College of Technology, Manchester, is retiring on superannuation in August next. The son of Dr. Robert Walker, of Carlisle, he was born in 1867, and received his education at Grosvenor College, Carlisle, and St. John's College, Cambridge. As engineering in the 'eighties was supposed by his relations to be unprofitable, he was put into the law and was articled to Messrs. Dobinson & Watson, solicitors, passing law examinations with honours in 1889. He joined the firm of Whitfield & Richardson, of Finsbury Pavement, and on the death of Mr. Whitfield he went to Finsbury Technical College where he studied electrical engineering under Silvanus P. Thompson and John Perry. In 1893 he became assistant to Prof. Thompson, and was joint author with him of several papers. Three years after he went to Cambridge.



[*Lafayette*

Professor Miles Walker

He joined the British Westinghouse Co. in 1899, and in the following year went to the works of the American Westinghouse Electric & Manufacturing Co. for three years, where he worked in design under Mr. B. G. Lamme, especially on a.c. generators and rotary convertors. He returned to Trafford Park in 1903 as chief designer of this class of machinery. He is the author of numerous I.E.E. papers, several of which have won the Institution Premium. He was appointed professor of electrical engineering in the University of Manchester in 1912. He has the degrees of M.A. (Cantab.), D.Sc. (Eng.), London, and he was elected a Fellow of the Royal Society in 1931. He is the author of several books on electrical machinery. Prof. Walker is the chairman of Section G.-Engineering of the British Association this year.

Mr. James Hamilton Steele, a former pupil with Crompton and Co., Chelmsford, was married on May 26th to **Miss Nesta J. Christy,** younger daughter of the deputy-mayor of Chelmsford, Alderman L. F. Christy, of Christy Bros. & Co., Ltd. The presents included cutlery, plate, and electrical fittings from the staff and employés of Christy Bros. & Co., Ltd., and an electric clock from the staff at the Deptford West power station.

Mr. J. R. M. Wilson has been appointed a director of Stewarts & Lloyds, Ltd.

Mr. D. P. Dunne and Capt. N. Stack discussing the latter's flight to India at the Exide Convention **(see p. 934)**

Mr. G. L. Kirkpatrick, M.I.E.E., has been appointed general manager of Messrs Bruce Peebles & Co., Ltd., and has resigned his position as a member of the directorate and the staff of Asea Electric, Ltd. **Mr. C. J. Hunt,** chief engineer, has been appointed assistant manager of Messrs. Bruce Peebles & Co., Ltd.

Mr. McLeman, who has resigned his position with Crompton-Parkinson, Ltd., is now associated with Laurence, Scott & Electromotors, Ltd., in the Midland area.

Obituary

Mr. T. Scott Anderson.—We regret to record the death, which occurred on June 10th at Endcliffe House, Bakewell, Derbyshire, of Mr. Tom Scott Anderson, A.M.Inst.C.E. He was seventy-five years of age, and was formerly a well-known consulting electrical and mechanical engineer carrying on business in Sheffield. He made a speciality of electro-metallurgy, and will be remembered as one of the pioneers of electric arc-welding in this country. Mr. Scott Anderson was born at Sutton-on-Trent, Nottinghamshire, and after education at Wesley and Firth Colleges, Sheffield (gaining a West Kensington Scholarship) he, at the age of eighteen, entered the Indian Civil Service, and was attached to the Cable-laying Department of the Indian Government. For five years he was engaged in connection with the laying of cables in Persia and later on returning to England became district engineer to the United Telephone Co. (subsequently the National Telephone Co.). His next step took him into the heavy-engineering field, and he was for four years with Crompton & Co., Ltd., at Chelmsford as assistant works manager. In 1892 he started business on his own account. He received a gold medal from the Indian Government for research work in electrometallurgy, and was made an honorary member of the French Institution of Civil Engineers for similar work. He was a member of several societies in this country and read papers before them. In the course of his career Mr. Scott Anderson had visited all parts of the world; he was intimately interested in the affairs of Bakewell, and he stood unsuccessfully as a Liberal candidate at a Derbyshire Parliamentary election. His son, Mr. A. D. Anderson, is a director of Weldries (1922), Ltd., Beeston, Notts.

The late Mr. T. S. Anderson

Ing. E. Rudolf.—The death is reported from Tetschen-a.-Elbe, at the age of sixty-nine years, of Ing. Ernst Rudolf, one of the leading electrical engineers of Czecho-Slovakia, who was responsible for the establishment of some of the largest power stations in that country.

Mr. H. Jackson.—The death occurred suddenly on June 12th of Mr. Herbert Jackson, who had since 1927 been traffic superintendent of the Manchester City tramways. He was 55 years of age, and had been in the Tramways Department for 32 years.

Wills.—Brig-Gen. the Hon. Everard Baring, who was chairman of the Southern Railway and a director of several other companies, including the London Electric Supply Corporation, Ltd., left £115,188 (net personalty £102,741).

Mr. A. H. Ringwood, of the Indian Institute of Science, Bangalore, left £5,605 (net personalty £5,602). He left his books, pamphlets and periodicals dealing with electrical or mechanical engineering to the Institution of Electrical Engineers.

Financial Section

New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares

New Companies Registered

Holway Lights, Ltd.—Private company. Registered June 15th. Capital £6,000 in 5,000 7 per cent. cumulative preference shares of £1 and 4,000 ordinary shares of 5s. each. Objects: To adopt an agreement with A. H. Holmes and E. M. Medway to acquire the patent granted to them for an invention relating to illumination and reflection of artificial light, and to carry on the business of electricians, mechanical engineers and manufacturers, &c. The directors are:—A. H. Holmes, Brick House Farm, Pitsea; J. Sumner, 49, Sandringham Avenue, Merton Park, S.W.19; and W. H. Martin, 4, Broad Street Place, E.C.2. Secretary: W. H. Martin. Registered office, 4, Broad Street Place, E.C.2.

Perivale Engineering Co., Ltd.—Private company. Registered June 13th. Capital £15,000 in £1 shares (10,000 "A" and 5,000 "B"). Objects: To carry on the business of manufacturers of and dealers in mechanical and electrical apparatus, &c. The subscribers are:—G. Parnell, 67, Fenwick Road, Peckham, S.E.; and E. A. Feazey, 134, Chandos Road, Stratford, E.15. Secretary: E. A. Feazey. Registered office: 21, Lime Street, E.C.

Ever Ready Electric Carbon Co., Ltd.—Private company. Registered June 16th, with a nominal capital of £50,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in carbon, graphite, plumbago, clay, or other refractory materials, carbon and bronze brushes, arc lamp carbons and all electrical carbon manufactured articles, &c. The directors are:—M. Goodfellow, "Oakdene," Lyonsdown Road, New Barnet, Herts; and A. H. Sheppard, Beechwood, The Broad Walk, Winchmore Hill, N.21 (both directors of Ever Ready Co. (Great Britain), Ltd.). Secretary: F. W. Stevens. Registered office; Hercules Place, Holloway, N.7.

Ever Ready Electric Bulb Co., Ltd.—Private company. Registered June 16th. Capital £10,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in all kinds of incandescent electric bulbs and other lamps, dynamos, motors, instruments, &c. The directors and other particulars are similar to those of Ever Ready Electric Carbon Co., Ltd.

Electro-Rentals, Ltd.—Private company. Registered June 16th. Capital £100 in £1 shares. Objects: To carry on the business of makers, sellers, hirers, renters, maintainers and workers of private telephones and telegraphs, and electrical apparatus of all kinds, &c. The directors are:—F. T. Jackson, 20, Herne Hill, S.E.24; C. P. Heseltine, Pinewood, Chislehurst, Kent; and W. S. Philcox, 8, Sunray Avenue, Herne Hill, S.E.24 (all directors of Telephone Rentals, Ltd.). Secretary: F. C. T. Lane. Registered office: Hollingsworth Works, Martell Road, West Dulwich, S.E.21.

Insular Electric Glowlamp Works, Ltd.—Private company. Registered June 17th. Capital, £1,000 in £10 shares. Objects: To carry on the business of manufacturers of and dealers in electric and other lamps, and of any articles and apparatus used in the electrical trade, &c. The subscribers are: W. H. Ockenden, 64, Anerley Road, S.E.20, and R. O'Reilly, 167, Gladstone Park Gardens, Cricklewood, N.W.2. Secretary: G. Youatt. Registered office: 2, Camomile Street, Bishopsgate, E.C.

Walter Lambert, Ltd.—Private company. Registered June 17th. Capital, £1,000 in £1 shares. Objects: To carry on the business of manufacturers, importers and exporters of and dealers in electric light and other shades and materials used in the manufacture thereof, wireless and radio apparatus, &c. The directors are: K. R. Lambert and W. Lambert, both of 20, Gaynesford Road, Forest Hill, S.E.23.

Returns of Electrical Companies

Adelaide Electric Supply Co., Ltd.—Capital, £3,000,000 in £1,750,000 preference stock, £750,000 preferred ordinary stock, and £500,000 ordinary stock. Return dated December 2nd, 1931. All stock taken up. £2,870,000 paid. £130,000 considered as paid. Mortgages and charges, £1,644,653.

P. S. R. Lamp Co., Ltd.—Capital £20,000 in £1 shares. Return dated January 14th, 1932. 14,750 shares taken up. £2,750 paid. £12,000 considered as paid. Mortgages and charges, nil.

C. N. Vernon & Co., Ltd.—T. J. Nicholas, 34, Brazennose Street, Manchester, was appointed receiver on June 7th under powers contained in debentures dated July 25th, 1929.

Fenriss (1932), Ltd.—Charge on freehold land forming part of Chase Estate, Park Royal, Acton, with factory thereon, dated May 26th, to secure all moneys due or to become due from the company to the National Provincial Bank Ltd.

Robt. F. Hearn, Ltd.—C. A. Sparks, 73, Wilton Road, Muswell Hill, N.10, was appointed receiver on June 13th, under powers contained in debenture dated February 1st, 1932.

A. E. Shearing, Ltd.—Mortgage debenture dated June 1st, 1932, to secure £200, charged on the company's undertaking and property, present and future, including uncalled capital. Holder: Mrs. A. Shearing, 23, Park Road, East Finchley, N.2.

Fullers (Ilford), Ltd.—Capital, £52,500 in 45,000 10 per cent. preferred ordinary shares of £1 and 150,000 deferred ordinary shares of 1s. each. Return dated December 31st, 1931 (filed February 23rd, 1932). 37 preference shares taken up. £37 paid. Mortgages and charges, nil.

Orion Lamps, Ltd.—Capital, £2,000 in £1 shares. Return dated January 1st, 1932. 1,245 shares taken up. £1,245 paid. Mortgages and charges, nil.

City Notes

The General Electric Co., Ltd., reports a profit for the year ended March 31st last of £1,057,657, as compared with £1,122,007 in the preceding year, to which is added £400,880 brought in, making £1,458,537. After deducting debenture interest (£204,661), depreciation (£236,953), directors' remuneration (£4,495), contribution to pension fund (£30,000), and preference dividends, and transferring £130,000 to reserve, there is a balance of £600,427 available. It is proposed to pay an ordinary dividend of 8 per cent. (against 10 per cent.), leaving £420,136 to be carried forward. With the present outlook, the directors think it expedient to strengthen the company's reserves, and therefore recommend a lower dividend.

The report states that in overseas markets political and economic troubles, accentuated by restrictions upon exchange and imports, have diminished the volume of export business. Such conditions have also affected adversely the trading of the company's overseas branches, though some temporary improvement has occurred in South Africa and China. The works have on the whole been well employed, and output has been maintained at a satisfactory level, though incoming orders in the heavy-engineering department show some decrease, owing mainly to the diminution of orders from industrial concerns. The development of the company's electricity supply undertakings has continued satisfactorily without depleting the cash resources, as additional finance has been provided independently. At March 31st the liquid resources amounted to £1,558,000, an increase of £384,000 over the preceding year. The

balance of the old 7 per cent. debenture stock was redeemed on September 30th last. The number of employés at March 31st was 24,185, a slight increase as compared with the previous year. Meeting: June 30th.

The India Rubber, Gutta Percha and Telegraph Works Co., Ltd., in a circular to shareholders, states that the continued deterioration in world economic conditions has so far prevented a further improvement in the company's trading position. While the turnover of Silvertown for the period under review is less than that for the corresponding period last year, the decrease is entirely due to the virtual cessation of the demand for a particular product in certain foreign markets, due to economic causes beyond the company's control. The depression in industry has gone from bad to worse, and the fact that Silvertown has, with the exception of the above-mentioned item, fully maintained its sales cannot be considered as unsatisfactory. The economies effected last year have been of great benefit, and further reductions in expenses have been and are being made, some of which should be reflected in the results for the second half of the year. Energetic steps have been taken to improve the Persan organisation, and in spite of lower turnover the trading position in France has improved. The Burton property and the cable steamer *Silvergray* are difficult to dispose of under existing conditions; every effort is being made in this direction, and in each case the maintenance expenses have been reduced to a minimum. The present circumstances do not warrant the payment of the arrears of dividends due to the preference shareholders, nor of the further dividend due to them on July 1st.

Hick, Hargreaves & Co., Ltd., report a profit for the year ended March 31st last of £4,673 as compared with £10,736 in the preceding year. After providing for depreciation, debenture interest and income tax, the net profit is £581 (£6,208); this, with £2,353 brought in, makes £2,934, which it is proposed to carry forward. The report states that the year has been one of great difficulty, and the effects of the severe depression in the engineering and other industries are reflected not only in a further contraction in the turnover, with a consequent reduction in trading profit, but still more seriously in the reduction of the value of the contracts secured during the year; in consequence the uncompleted work on the company's books is less than at the commencement of the year. The new Compressor Department has made satisfactory progress in view of the adverse conditions. The buildings, plant and machinery have been maintained in good condition and valuable additions have been made to the equipment of the works. The resignation of Lt.-Col. B. A. Wright from the board, owing to ill-health, and the appointment of Mrs. C. L. Wright to fill the vacancy are recorded. Meeting: June 29th.

The British Electric Traction Co., Ltd., held its annual meeting on June 21st, Mr. J. S. Austen (chairman) presiding. In presenting the report and accounts (ELEC. REV., June 10th, p. 865), the chairman said that the most important matter of the past year was the sale of their interest in the Scottish General Transport Co. The result was that they received about a quarter of a million which had hitherto been unproductive and now, by reinvestment, would once more be usefully employed. They had acquired a controlling interest in the Antrim Electricity Supply Co., which was still in a state of development. This was one of the subsidiaries which had incurred a loss during the year, but they bought it with the full knowledge that there would be a loss. They were giving a bonus of 100 per cent. in stock and having double the stock the shareholders would receive double the amount of dividend. Regarding the future, there was no reason why their income for the current year should not be equal to that of the past year.

Richardsons, Westgarth & Co., Ltd., report a net loss for 1931 of £6,993. This has been met by transferring £6,000 from preference dividend reserve and £1,000 from income-tax account, a credit balance of £169 being carried forward. The report states that no orders for marine engines, steam or oil, have been booked since July, 1930, and that since the completion in August last of all marine work on order the company has been entirely dependent on land contracts and repair work. For many years it has been engaged in the manufacture of turbines, and recently of alternators, under licence from Messrs. Brown Boveri, of Baden, and arrangements have been practically concluded which it is hoped will lead to a considerable increase in the manufacture of turbo-alternators and auxiliary plant for use on land. Meeting: June 28th.

The Rees Roturbo Manufacturing Co., Ltd., reports a surplus on trading in 1931 of £2,504 (as against £4,578 for 1930). First debenture interest absorbs £2,499, leaving £5, and it is proposed to make provision for interest on the second debentures and for depreciation on plant, &c., by transferring £4,418 from general reserve, leaving this account at £5,800. Trade depression adversely affected the company's sales during the year, but since the end of the year there has been a considerable increase in the value of orders on the books. Meeting: June 30th.

Ransome, Sims & Jefferies, Ltd., report that after providing for depreciation, debenture interest, &c., there is a net loss for the year ended March 31st last of £18,042 (against £28,348 for 1930-31). This is deducted from a balance of £25,729 brought in, leaving £7,686 to be carried forward. The directors state that the condition of export markets has been such that it has only been possible to do a small proportion of the company's normal export trade. By strenuous efforts in maintaining the home trade, and by the most rigid economy, the loss has been restricted to the figure mentioned.

The Globe Telegraph & Trust Co., Ltd., reports that the revenue for the year ended May 31st last, after deducting expenses, was £45,042, as compared with £255,481 in the preceding year. To this is added £16,633 brought in and £25,000 transferred from reserve, making £86,675. The preference dividends absorb £80,826 and £5,849 is carried forward. Meeting: June 28th.

Edgar Allen & Co., Ltd., report a loss for the year ended March 31st last of £17,008 (as against £18,702 in 1930-31). There was, however, a profit of £7,480 on exchange, and after crediting interest receipts and writing off £3,038 from loose tools, &c., the net loss was £11,053 (£34,776). No provision has been made for depreciation. The debit balance carried forward is £43,150.

James Keith & Blackman Co., Ltd., reports a net profit for the year ended March 31st last of £3,056, as compared with £22,373 in 1930-31. It is proposed to pay an ordinary dividend of 5 per cent. (against 10 per cent.), but no bonus is to be paid to the staff (against £2,430). The amount carried forward is £12,019 (£18,575). Meeting: To-day (Friday).

The Victoria Falls & Transvaal Power Co., Ltd., has announced a final dividend of 1 per cent. on the preference shares, making 10 per cent. for 1931 (same), and a dividend of 3 per cent. for the half-year ending June 30th (same). The final ordinary dividend is maintained at 12 per cent., again making 15 per cent. for the year.

The Norwich Electric Tramways Co. announces that negotiations are in progress for the sale of the tramway and omnibus undertaking to Norwich Corporation. The proposed purchase price is £175,000, exclusive of stores and loose materials. The investments, cash, and other liquid assets of the company would not be included in the sale.

Tube Investments, Ltd., proposes to increase its capital to £3,000,268 by the creation of 18,000 7 per cent. "B" preference and 9,000 ordinary shares of £1 each. The new capital is required to purchase the capital of the Stella Conduit Co. by an exchange of shares. A meeting to approve the increase was held on Wednesday last.

W. T. Henley's Telegraph Works Co., Ltd.—Subject to audit, the directors have decided to recommend a final dividend on the ordinary shares of 2s. 6d. per share, less tax, making, with the interim dividend, 4s. per share for the year. They also recommend a cash bonus of 2s. per share, less tax. The distribution is the same as for 1930-31.

The Lima Light, Power & Tramways Co. reports receipts for 1931, after deducting working expenses, of $/o 3,974,693, which with interest, rentals, &c., makes $/o 4,326,241. After deducting bond and other interest, &c., there is a deficit of $/o 1,966,531.

The Chiswick Electric Supply Corporation, Ltd., is offering for subscription by shareholders, by way of "rights," 50,000 ordinary shares at 21s. each, in the proportion of one new share for every four now held.

The Eastern Telegraph Co., Ltd., announces a dividend at the rate of 3½ per cent. per annum, less tax, on the preference stock for the quarter ending June 30th.

The Electric & General Investment Co., Ltd., announces that no dividend will be paid on the ordinary shares (last year 10 per cent.) or on the deferred shares (against 100 per cent.).

Greenwood & Batley, Ltd., have announced an ordinary dividend of 2½ per cent. for the year ended March 31st last (against 5 per cent. for 1930-31.)

The Radio Corporation of America has omitted the payment of the quarterly dividend of 87½ cents per share due on the preferred "A" stock.

Stocks and Shares

TUESDAY EVENING.

THE opening of the Lausanne Conference proved a stimulating influence upon the prices of stocks and shares in most markets. The Stock Exchange has become busier, and there is a more ready disposition on the part of the public to take practical interest in shares outside the charmed area of gilt-edged stocks. The prices of the latter securities show no abatement of strength. There continues to be a steady realisation of the War Loan on the part of private investors, and a reinvestment of the money in stocks and shares of first-class character. Amongst these, the recently issued Central Electricity 4½ per cent. stock stands out as something of a feature. The £10,000,000 stock issued at 96 was more than covered, as mentioned here last week, but the opening price of a shade under "par" suggested that the stag division was present in some force. The stag stock, however, was rapidly absorbed, and the price improved to 1 premium. The fact of this substantial amount being so readily taken by investment is regarded as a safe pointer to the fact that substantial support can be relied upon by any good-class borrower.

Debenture Stocks

The rise in Central Electricity new scrip served to draw attention to other sound stocks connected with the electrical industry. Kent Electric Power 4½ per cent. debenture has gained 4, rising to 90, Metropolitan Electric 4½ per cent. first debenture at 97, and County of London 5 per cent. debenture at 107½, are both a point to the good. The 4½ per cent. debenture stocks of the South London and the South Metropolitan Electric Lighting Companies advanced to the common price of 96½. The only changes in the ordinary shares of the London Electricity Supply group are rises of 6d. apiece in Charing Cross and London Electrics. The Chiswick Electricity Supply Corporation shareholders are offered, by way of rights, one new share at 21s. in respect of every four old shares. In the Colonial list, Victoria Falls ordinary are steady at 3, upon repetition of the previously paid dividend of 15 per cent.

Home Railway Stocks

This demand for good stocks has extended to Home Railway prior charge issues, in spite of the fact that Home Railway ordinary stocks are now standing at levels lower than they have ever touched before. The amount of debenture stocks on offer is very small. Metropolitan Railway ordinary stock pursues

the erratic course which it has lately adopted. After a jump to 54, the price reverted to 51½, showing no change on the week. Underground Electrics remain dull at 16s., and Districts keep about 50½. The three assented stocks of the Central London Railway—ordinary, preferred and deferred—have improved to 73½ for each stock. Metropolitan District 5 per cent. debenture is better at 8 premium, Metropolitan 5 per cent. debenture advanced to 7½ premium, being rises of 10s. per cent. in each case. British Electric Traction preferred ordinary stock fell back 3 to 122½.

Cables and Wireless

Rumour sports with the idea that the Commission appointed to inquire into cable communications will recommend an agreement between the Cables and Wireless combine and the Post Office. The air is thick with talk as to the prospects; the three cables and wireless stocks have become popular gambling counters. The 7½ per cent. "A" ordinary at 14 shows a gain of 1½, the 5½ per cent. preference stock being unchanged, however, at 42½. Globe Telegraph and Trust revenue for the year to May 31st last has fallen from £255,000 last year to £45,000 for the twelve months recently ended. Payment of the preference dividend is made possible by a transfer from the reserve, and £5,800 goes forward, against £16,600 brought into the accounts. The ordinary shares receive no dividend, against 8½ per cent. paid last year, and 10 per cent. in the year before that, but the price is 7s. 6d. higher at 3½. Marconi Marines are a better market at 24s. 6d., and Anglo-Orientals have improved to 2⅞. In the transatlantic group, American Telephone and Telegraphs at 115 are just ex dividend. Internationals are better at 5 in sympathy with the better tone which has lately developed in American issues as a whole, as the outcome of hopes that the Lausanne Conference may propose adjustment of war debts.

Anglo-American Telegraph preferred stock has fallen 3½ points to 90, and the deferred is ½ down at 20½. The company's ordinary stock has fallen to 55½. The reason for these declines is the passing of its dividend by the Western Union Telegraph Co. This seems to be scarcely sufficient cause for the sharpness of the falls, and it is probable that when the present spasm of apprehension has passed, these three stocks will rally, having regard to the nature of the security at the back of them.

Manufacturing and Equipment

Disappointment was expressed in some quarters at the reduction to 8 per cent. for the year in the dividend on General Electric ordinary. The previously entertained expectation in some quarters that the dividend would be maintained at last year's rate of 10 per cent. appeared to be, however, decidedly optimistic, in view of the conditions of the times. The company may be deemed to have done very well to make a profit of over £1,000,000, which shows a reduction of £64,000. The price of the ordinary shares, after weakening to 33s., recovered to 33s. 9d., which shows a slight improvement on the week. Henley's have done well in making up the dividend and cash bonus for the year to 30 per cent., which has been paid for several years past. No surprise would have been felt if there had been a reduction in the distribution. Brush ordinary stock has dropped 8 points to 47. The dividend, it will be remembered, was recently passed. Siemens have recovered to 19s. 6d., and British Aluminium ordinary shares are back to £1. The India Rubber, Gutta Percha and Telegraph Works has announced that the preference dividend due on July 1st will not be paid. The price of the shares is quoted nominally at 8s. 9d. Business was recently marked at 6s. The last dividend paid on the shares was in June, 1930.

Ever Ready shares are a shade harder at 21s. 3d. Two private companies recently registered are the Ever Ready Electric Carbon and the Ever Ready Electric Bulb. The capitals are £50,000 and £10,000 respectively.

Foreign Stocks

Mexicans are again very flat. The news from the country is disquieting, and the stocks of the utility companies are quietly pressed for sale. Mexican Light & Power 7 per cent. preferred shares have dropped 5, the ordinary shares 2½. Mexico Tramway 5 per cent. bonds are 2 down. Amongst other dollar stocks, City Services preferred have recovered, from 15, to 5 points higher. Rio Tramway 5 per cent. Mortgage bonds weakened to 32½. Anglo-Argentine Tramways have given way: the second preference shares being an exception with an improvement of ⅛ to 3s. 9d. The 5 per cent. debenture has fallen to the bagatelle price of 7, and the 4 per cent. first debenture stock is down to 32½. Brazilian Tractions at 11½ have been hardly affected by the issue of an annual report that makes very interesting reading.

Tokyo Electric 6 per cent. bonds have dropped to 55½. Whitehall Electric preference are flat at 12s.

Atkin's Manual

The new edition of *Atkin's Manual* has appeared this week, and makes an invaluable contribution to the library of financial reference books. The handsome volume, containing, as it does, nearly 500 pages, deals with electrical companies of all kinds, and in a manner that few, if any other, books of its kind encompass. The information is set out with remarkable clearness, and it is hardly too much to say that the book is indispensable to those interested in electrical undertakings.

Share List of Electrical Companies

HOME ELECTRICITY COMPANIES.

	Nom.	Approx. Dividend. 1930.	1931.	Price. June 21.	Rise. or Fall.	Yield. p.c. £ s. d.
Bournemouth and Poole	1	15	15	60/9	—	4 18 9
Brompton Ordinary	1	8½	8½	28/-	—	5 0 0
Central Electricity 4½% Deb. ...	Stock	4½	4½	98	—	4 11 10
Charing Cross Ordinary	1	8½	8½	29/6	- 6d.	4 15 0
Chelsea	1	8⅞	8⅞	27/6	—	5 1 10
City of London	1	10	10	38/3	—	5 4 7
Clyde Valley	1	8	7	27/6	—	5 1 10
County of London	1	11	10½	41/3	—	5 1 9
Edmundsons' 7% Pref.	1	7	7	26/6	—	5 5 8
Elec. Dis. Yorkshire	1	9	9	35/-	—	5 2 10
Elec. Supply Corporation	1	11	11	47/6	—	4 12 7
Kensington Ordinary	1	8	8	28/6	—	4 18 3
Lancs. Light and Power	1	6½	7	26/3	—	5 6 8
London & Home Counties 4½% Deb.	Stock	4½	4½	98	—	4 11 10
London Electric	1	9	9	28/6	+6d.	4 18 3
Metropolitan	1	10	10	42/-	—	4 15 3
Midland Counties	1	7	7	28/9	—	4 17 5
Mid. Elec. Power	1	8	8	30/-	—	5 6 8
Newcastle-on-Tyne Ordinary ...	1	6	6	23/3	-6d.	5 3 3
Do. 7% Pref.	1	7	7	27/6	—	5 1 10
Northampton	1	10	10	40/9	—	4 18 2
Notting Hill 6% Pref.	10	6	6	11	—	5 9 1
North Met. Elec. 6% Pref. ...	1	6	6	25/-	—	4 16 0
St. James' and Pall Mall	1	8	8	29/-	—	4 16 7
Scottish Power	1	8	—	28/3	—	5 13 3
South London	1	8½	8½	28/6	—	4 18 3
Urban Ordinary	1	7	—	28/9	—	4 17 5
Westminster Ordinary	1	8½	8½	28/-	—	5 0 0
Whitehall Elec. Invst. 7½% Pref....	1	7½	7½	12/-	-4/3	12 10 0
Yorkshire Elec.	1	8	8	33/9	—	4 14 10

HOME RAILS.

Central London Ord. Assented ...	Stock	4	4	73½	+1	5 8 10
Metropolitan	„	4	3½	51½	—	6 16 0
Do. District	„	5	4½	50½	—	8 18 2
Underground Electric	1	8	7	16/-	—	8 15 0

TELEGRAPHS AND TELEPHONES.

American Tel. & Tel.	$100	9	9	115xd.	+3½	7 16 6
Anglo.-Am. Tel. Pref.	Stock	6	6	90	-3½	6 13 4
Do. Def.	„	1½	1½	20½	-½	7 6 4
Cables & Wireless 5½% Pref. ...	„	5½	Nil	42½	—	—
Do. A 7½% Ord.	„	—	Nil	14	+1½	—
Do. B Ord.	„	—	Nil	7	—	—
Globe Tel. and T. Ord.	10	8½	Nil	3½	+⅜	—
Do. do. Pref.	10	6	6	6½	+½	9 4 6
Great Northern Tel.... ...	10	20	20	22	—	9 1 0
Marconi-Marine	1	15	10	24/6	+9d.	8 3 1
Oriental Telephone Ord.	1	12	12	2⅜	-⅛	*5 1 0

HOME AND FOREIGN TRAMS, ETC.

Anglo-Arg. Trams First Pref. ...	5	—	—	3/9	-⅛	—
Do. do. 2nd Pref.... ...	5	—	—	3/9	+⅛	—
Do. do. 5% Deb.	Stock	—	—	7	-1	—
British Electric Traction Def. Ord.	„	5	5	650	—	—
Do. do. Pref. Ord. ...	„	8	8	122½	-3	6 10 6
Brazil Traction	100	—	—	11½	—	—
Brit. Columbia Elec. Rly Pce. ...	Stock	5	5	88½	-1	5 13 0
London & Sub. Trac. 5% Pref. ...	1	Nil	Nil	3/9	—	—
London United Tram Deb. ...	Stock	4	4	56½xd.	+½	7 1 7
Mexico Trams, 5% Bonds... ...	—	5	5	20½	-2	24 7 8
Mexican Light Common	100	Nil	Nil	10	-2½	—
Do. 7% Pref.	100	7	7	15	-5	—
Do. 1st Bonds	—	5	5	51½	-1	9 14 2
Victoria Falls Ord.	1	15	15	60/-	—	5 0 0
Yorkshire (West Riding)	1	Nil	Nil	5/-	+6d.	—

MANUFACTURING COMPANIES.

Assoc. Elec. Ord.	1	6	4	16/3	—	4 18 6
Do. Pref.	1	8	8	28/-	—	5 14 4
Babcock & Wilcox	1	15	14	37/6	—	7 9 4
British Aluminium Ord.	1	10	5	20/-	-9d.	5 0 0
British Insulated Ord.	1	15	15	53/9	—	5 11 6
Brush Ord.	Stock	5	Nil	47	-8	—
Callender's	1	15	15	52/6	—	5 14 3
Do. 6½% Pref	1	6½	6½	25/-xd.	—	5 4 0
Crompton Parkinson Ord.... ...	5/-	30	24	16/3xd.	—	7 8 0
Do. 8% Pref....	1	8	8	27/6xd.	+6d.	5 16 5
Edison-Swan 1st Pref.	1	7½	7½	23/3	—	6 9 0
Do. 5% Deb....	Stock	5	5	92½xd.	+2	5 8 1
Electric Construction	1	Nil	Nil	7/6	—	—
Enfield Cable Ord.	1	25	25	3⅛	—	7 19 9
English Electric	1	Nil	Nil	8/9	—	—
Do. do. Pref.	1	Nil	Nil	10/-	—	—
Ever Ready	5/-	35	35	21/3	+3d.	8 5 6
Ferranti Pref.	1	7	7	22/-	—	6 7 3
G.E.C. Pref.	1	6½	6½	25/6	—	5 2 0
Do. Ord....	1	10	8	33/9	+6d.	4 15 0
Henley's	1	30	30	5	—	6 0 0
Do. 4½ Pref.	5	4½	4½	4½	—	5 0 0
India-Rubber	1	Nil	Nil	4/6	—	—
Johnson & Philips	1	10	5	⅜	—	6 13 4
Siemens Ord.	1	7½	7½	19/6	-6d.	7 13 10
Telegraph Construction	12	Nil	Nil	9½	—	—

* Dividends paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged, and all subsequent proceedings will be taken.

1930

35142. "Electric resistance regulators or dimmers." M. Mansell. November 21st, 1930. (Cognate application 4455/31.) (373625.)

38238. "Oil-containing electrical apparatus." Siemens-Schuckertwerke Akt.-Ges. December 19th, 1929. (373637.)

1931

4762. "Means for cooling electrically driven rotary compressors of refrigerating apparatus." Lipman Patents Corp. February 14th, 1930. (373645.)

5067. "Means for transmitting current impulses in long-distance signalling installations." Siemens & Halske Akt.-Ges. May 9th, 1930. (373650.)

5424. "Dynamo-electric machines." International General Electric Co., Inc. February 21st, 1930. (373603.)

5803. "Coil-ignition apparatus for motor cycles and the like." British Thomson-Houston Co., Ltd., and C. J. Morton. February 24th, 1931. (373607.)

5936. "Electric valve amplifiers." C. V. C. Herbert. February 25th, 1931. (373622.)

5946. "Thermionic oscillation generators." Telefunken Ges. für Drahtlose Telegraphie. March 1st, 1930. (373632.)

5951. "Two-way telephonic transmission systems and the like." Electrical Research Products, Inc. March 8th, 1930. (373623.)

5980. "Dry rectifier." E. Lichtenthal. February 26th, 1930. (373633.)

6029. "Electron-discharge devices." Standard Telephones and Cables, Ltd., and L. H. Bedford. February 26th, 1931. (373634.)

6736. "High-frequency operation on lines." International General Electric Co., Inc. March 5th, 1930. (373670.)

6957. "Control of dynamo-electric machines connected in parallel or series." Guy Motors, Ltd., and W. A. Stevens. March 6th, 1931. (373677.)

7197. "Electro-dynamic device for loudspeakers and the like." A. F. Cross. March 9th, 1931. (373682.)

7813. "Antenna systems." Marconi's Wireless Telegraph Co., Ltd. June 11th, 1930. (373692.)

8636. "Synchronous alternating current motors." General Electric Co., Ltd., H. C. Turner, and A. Sherwin. March 20th, 1931. (373700.)

10143. "Electrical soldering apparatus." J. Kennedy. April 7th, 1931. (373718.)

10817. "Cores for electric dry batteries and the like." Autom Spezial-Maschinen Ges. February 24th, 1931. (373723.)

10857. "Constructional arrangements for use in connection with high-frequency electrical apparatus." Telefunken Ges. für Drahtlose Telegraphie. April 11th, 1930. (373724.)

10966. "Counter-operated control mechanisms." W. T. Henley's Telegraph Works Co., Ltd., and F. H. Fry. April 14th, 1931. (373726.)

11614. "Arc-welding processes and plant therefor." G. R. Adamson. April 20th, 1931. (373735.)

12841. "Thermal cut-outs for electrically heated receptacles." Burnley Components, Ltd., and D. K. Ward. May 1st, 1931. (373750.)

12877. "Combined motion picture and sound reproducing apparatus." Electrical Research Products, Inc. May 31st, 1930. (373751.)

13318. "Link distributing frame for telephone systems." Siemens Bros. & Co., Ltd., S. S. Danks, and A. F. Thorne. May 6th, 1931. (373757.)

13555. "Alternating current measuring apparatus." C. H. Smith. May 7th, 1931. (373762.)

13819. "Conversion of polyphase currents into single-phase currents." Dr. O. Lobl. May 9th, 1931. (373766.)

14715. "Reflectors of electric lamps." Maxlume Lighting & Heating Co., Ltd., and F. W. Thorpe. May 19th, 1931. (373774.)

14925. "Electric discharge lamps." General Electric Co., Ltd., and N. L. Harris. May 20th, 1931. (373776.)

18274. "Ignition arrangements for internal combustion engines." Dr. H. Ewest. June 28th, 1930. (373811.)

18775. "Electric control arrangements." Hauser & Co., Ges. January 20th, 1931. (373815.)

18792. "Electric discharge lighting tubes with rare gas filling, in particular for illuminated advertising purposes." F. Skaupy. July 14th, 1930. (373817.)

19394. "Electricity meter." Landis & Gyr, Soc. Anon. July 24th, 1930. (373823.)

20333. "Electric ovens." British Thomson-Houston Co., Ltd. July 16th, 1930. (373831.)

20415. "Electrode housing for electric signs." R. Macey. January 8th, 1931. (373834.)

20507. "Electric switchgear installations." Felten & Guilleaume Carlswerk Akt.-Ges. July 23rd, 1930. (373835.)

20814. "Means for the electro-magnetic opening of doors from a distance." A. Capre. July 21st, 1931. (373840.)

21184. "Electric heating devices." British Thomson-Houston Co., Ltd. July 31st, 1930. (373845.)

21592. "High-frequency oscillation generating and transmitting systems." Marconi's Wireless Telegraph Co., Ltd. July 28th, 1930. (373847.)

21708. "Electrical rectifiers." R. Audubert. December 30th, 1930. (373849.)

23337. "Delayed action electric switches particularly for driving direction indicators." W. Grohn. August 19th, 1930. (373862.)

23883. "Photo-electric cells." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. December 6th, 1930. (Addition to 343930.) (373867.)

25935. "Television systems." Electrical Research Products, Inc. September 27th, 1930. (373888.)

26072. "Brush-holders for dynamo-electric machines." British Thomson-Houston Co., Ltd. September 18th, 1930. (373890.)

26867. "Electrical switches." R. Bosch, Akt.-Ges. October 11th, 1930. (373898.)

27247. "Portable electrically driven band saw machines." Maschinenfabrik Fellbach Ges. September 30th, 1930. (373901.)

28532. "Loudspeaker chassis." Ideal Werke Akt.-Ges. für Drahtlose Telephonie. July 25th, 1931. (373907.)

28702. "Electrical heating elements." G. Bray. August 24th, 1931. (373909.)

29025. "Process for the manufacture of rectifiers." Siemens & Halske, Akt.-Ges. October 17th, 1930. (373914.)

29366. "Earphones." Deutsche Akustik Ges. June 1st, 1931. (373916.)

29608. "Relaying systems for radio signalling." M. Von Ardenne. October 30th, 1930. (373919.)

30037. "Directional radio transmitting systems." Telefunken Ges. für Drahtlose Telegraphie. October 29th, 1930. (373922.)

30267. "Alternating current potentiometers." A. Campbell. November 2nd, 1931. (Addition to 342441.) (373924.)

30464. "Automatic arc welding." International General Electric Co., Inc. November 3rd, 1930. (373926.)

31339. "Luminous electric discharge tubes." General Electric Co., Ltd. February 14th, 1931. (373928.)

1932

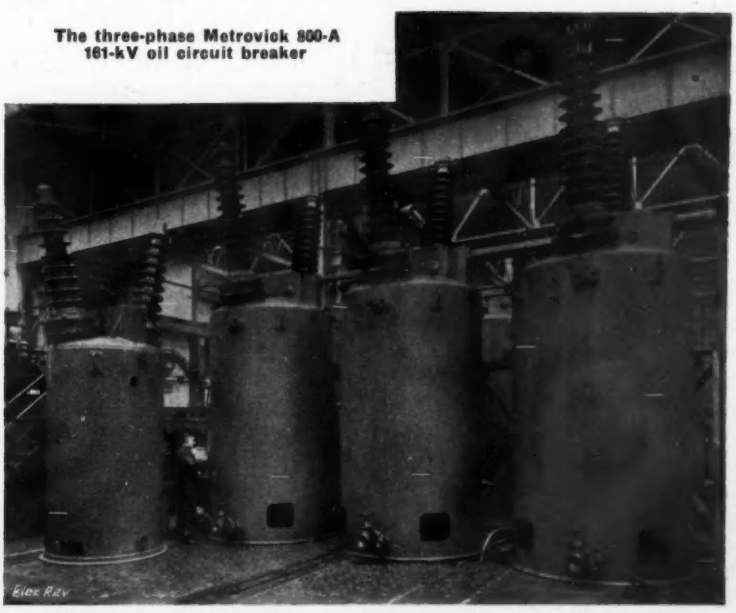
2310. "Electric motors, more particularly for talking machines." R. Bosch Akt.-Ges. February 21st, 1931. (373956.)

A Large Oil Circuit Breaker

THE Metropolitan-Vickers Electrical Co., Ltd., has recently brought out a three-phase, 800-A, 161-kV oil circuit breaker with a breaking capacity of 2½ million kVA, forming part of a group of twelve similar circuit breakers in process of manufacture for a hydro-electric station abroad. These are claimed to be the largest oil switches so far manufactured in this country, and for purposes of comparison one pole of a 132-kV circuit breaker manufactured for the British grid system is shown on the left. Each tank is 6.5 ft. in diameter and 20 ft. high, and contains 1,830 gallons of oil; the corresponding figures for the 132,000-V grid breakers are 16.3 ft. in height with an oil capacity of 920 gallons.

These circuit breakers are designed with a system of bushing removal developed by the Metropolitan-Vickers Co. whereby insertion or removal of the large condenser bushings may be performed in the minimum of time without altering the alignment of the fixed contacts, and without emptying the tanks. The rectangular projection on each tank houses the link mechanism, which gives a parallel motion to the moving contacts, the three units of each circuit breaker being operated simultaneously by means of a motor drive through the enclosed horizontal shaft.

The three-phase Metrovick 800-A 161-kV oil circuit breaker



New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Acton.—Factory for Lancashire Dynamo & Crypto, Ltd., Acton Lane; Wesley Estates, Ltd.

Ashton-under-Lyne.—Houses (60), Hurst; borough surveyor.

Banbury (OXON).—Houses (34); R.D.C. surveyor. Houses (60); borough surveyor.

Barrow-in-Furness.—Church (£7,000); Rainey Brothers, Ltd., builders, Iron Works Road.

Beverley (YORKS).—Houses (42) for T.C.; Robinson & Sawdon, builders, Hull.

Bilston (STAFFS).—Bazaar premises, Church Street, for Marks and Spencer, Ltd.; Bovis, Ltd., builders, Upper Berkeley Street, London, W.1.

Birmingham.—Rebuilding cinema, Stratford Road and Nansen Road; Satchwell & Roberts, architects, 6, New Street.

Bournemouth.—Extensions and new wings for the High School for Girls (£160,000); T. Worthington & Sons, architects, 178, Oxford Road, Manchester.

Brierley Hill.—Reconstruction, Palace Theatre, for Cecil Couper. Laundry and transformer house, for Marsh & Baxter, Ltd.

Bristol.—Houses (84) and flats (16), Bedminster Estate, and houses, St. Phillips (£5,719); John Knox (Bristol), Ltd. Houses (100), Knowle Estate (£31,974); W. J. Simms, Sons & Cooke, Ltd. Central school for girls, Kellaway Avenue; E.C.

Bromley (KENT).—Houses (202), off Burnt Ash Lane, for Brise's London and Suburban Estates. Houses (21), for Easter and Webb. Ante-natal clinic, maternity hospital, and extensions, Bromley Model Laundry; P. A. Coad, architect.

Bury (LANCS).—Re-erection of corn stores, Knowsley Street, for T. E. Mansergh (£20,000). Additions to St. Mary's Home, Duke Street; borough engineer, Bank Street.

Bury St. Edmunds.—Bazaar premises, for Marks & Spencer, Ltd., 21, Chiswell Street, London, E.C. Business premises, for Montague Burton, Ltd., tailors, Leeds.

Caine.—Houses (36), for T.C.; J. C. Walters, builders, Wootton Bassett.

Cambridge.—Men's hospital, Papworth Village Settlement for the Tuberculous (£22,000); Reynell Wreford, organising secretary.

Carnarvonshire.—Elementary School, Dolwyddelen, for E.C.; W. L. Jones, county architect, 14, Market Street, Carnarvon.

Castle-Douglas.—School (£17,000), for Stewartry E.C.; director of education.

Cheshire.—Schools (720 places), Wellington Road, Timperley, for County E.C.; director of education, Chester.

Consett (CO. DURHAM).—Houses (58); U.D.C. surveyor, Council Offices.

Coulsdon.—Post office, Valley Road; Postmaster-General.

Cranbrook (KENT).—Houses (20), for R.D.C.; Eric Clarke, clerk.

Croydon.—Congregational Church, Sanderstead; Rev. E. E. Cleal, 16, Elgin Road, Addiscombe. Boiler house and plant, mental hospital (£9,900); borough engineer.

Devon.—Extensions, Langdon Farm defectives colony, Dawlish (£49,165); county architect, Exeter.

Dudley.—Houses (32), Wolverton Road; borough surveyor.

Ealing.—Houses (60), Elton Avenue; R. Costain & Sons, 7 & 8, Norfolk Street, Strand, W.C. Flats (120), Hanger Lane; G. W. Smith, architect, 6, New Square, Lincoln's Inn. Arcade of 12 shops with assembly rooms, Old Oak Common Lane, for J. A. Perriss; H. Kenchington.

Easingwold (YORKS).—Houses (22); R.D.C. surveyor.

Eccles.—Houses (100), Haddon Estate; borough engineer.

Edinburgh.—Houses (24), Colinton Road; J. Jerdan, architect, 12, Castle Street. Houses, Niddrie Mains (228), and Saughton (102); city architect.

Elgin.—School, Bishopsmill; executive officer to the Morayshire Authority.

Farnborough (HANTS).—Houses (28); U.D.C. surveyor.

Fifeshire.—Mining school, Cowdenbeath (£15,500), and high school, Dunfermline (£97,822); master of works, Education Committee, Kirkcaldy.

Fowey (CORNWALL).—Conversion of bank into post office, for H.M. Office of Works, King Charles Street, S.W.1.

Guildford.—Houses (67), with electrical work, Littleford Lane Estate, for Mr. Beagley, Shalford.

Haddington (EAST LOTHIAN).—Stores (£5,000), for the Co-operative Society; secretary.

Hanging Heaton (YORKS).—Church and school for the trustees of Hanging Heaton Church; J. Berry & Sons, architects, Market Walk, Huddersfield.

Hebburn-on-Tyne.—Houses (122), Hedgeley Road, for U.D.C.; T. A. Page & Sons, architects, 67, King Street, South Shields.

Hemsworth.—Senior mining institute; education architect, County Hall, Wakefield.

Herne Bay.—Bank, for Midland Bank, Ltd.; Whinney, Son, Austin & Hall, architects, 8, Old Jewry, London, E.C.

High Wycombe.—Re-erection of factory, Dovecote, Frogmoor, for the Universal Chair Co.

Hull.—Church, Derringham Bank Housing Estate; Gelder and Kitching, architects, 120, Alfred Gelder Street, Hull.

Hyde (CHESHIRE).—Housing scheme, Back Bower Estate; borough engineer.

Irish Free State.—(AGHAVOE, Co. LEIX).—National School; Rev. J. Carroll, Ballacolla, Leix. (ATHY).—Houses (100); J. W. Lawler, town clerk. (SLIGO).—County vocational school building; J. K. Murphy, chief executive officer to Sligo Vocational Education Committee. The Courthouse. (WATERFORD).—Rebuilding of Manor Street schools; Rev. Bro. J. A. Walker, Superior Christian Brothers, Mount Sion, Waterford. (DUNDALK, Co. LOUTH).—Houses (90); J. F. Doris, borough surveyor, Town Hall.

Kendal.—Houses (111); F. W. Oxberry, borough surveyor.

Leek (STAFFS).—Extensions, for G. H. Brough, Novi Lane Dyeworks. Houses (40), Haregate Estate, Ball Haye Green; W. E. Beacham, U.D.C. surveyor, Town Hall.

Leeds.—Extension of St. Augustine's R.C. Church, Harehills (£8,000); Rev. P. Leonard, rector.

Leigh (SURREY).—Small holdings (163 acres); Surrey County Agricultural Committee, Kingston.

Littlehampton (SUSSEX).—Amusement park for Messrs. Butlin, Skegness.

Liverpool.—Houses (44), Dovecot Estate; land steward and surveyor, Municipal Buildings.

London.—(ELTHAM).—School, Middle Park Estate, for L.C.C. Education Committee. (GROVE PARK).—Parish hall (£5,500), St. Augustine's parish; Rev. T. P. Stevens, vicar. (LAMBETH).—Re-erection of scenery factory, Linford Street, for Julian Wylie Productions, Ltd. (£5,000). (HACKNEY).—Tenements, Lower Clapton Road (£151,000); Messrs. Josephs, architects.

Lowestoft.—Houses (60); A. Ingles. Houses (60), Church Road; Mobbs Bros., Ltd.

Lye and Wollescote.—Houses (100) for the U.D.C.; Thomas Barker & Sons, builders, Loughborough.

Orpington.—Wesleyan School Church (£5,000); trustees.

Otley.—Alterations, Market Place; Freeman, Hardy & Willis.

Oxford.—Bank, Carfax, for Glyn Mills & Co., 67, Lombard Street, E.C.

Paignton.—Sewerage scheme (£109,548); A. E. Farr.

Paisley.—Houses (248); borough surveyor.

Manchester.—Schools for St. John's Church, off Stockport Road, Longsight; Alfred Hodkinson, Ltd., builders, 62, Greenhill Street, Greenheys. Houses (236), Debdale Park, Gorton; housing director, Town Hall. Houses (24), Talbot Road, Ladybarn, off Kingsway; P. C. Larmuth, architect, 23, King Street. Church (£20,000), Roundthorns, for the Parochial Council of St. Matthews and St. Aidan's; Taylor & Young, architects, 19, Chapel Walks. Elementary school (1,000 places), Victoria Avenue, East Blackley, for the E.C.; Architects' Department, Education Offices, Deansgate.

Mitcham.—Houses (257), Mitcham Road Estate; H. Macintosh, East Croydon.

Morden (SURREY).—St. Peter's Parish Church, St. Helier Estate (£13,500); Sir Charles Nicholson, architect.

Newcastle-on-Tyne.—School, Westgate Road; Education Department, Northumberland Road. Houses (25), Heaton Hall Estate, for W. E. Hall, builders, Gateshead.

Newport (MON).—Reservoir, Talybont (£315,894); G. Percy Trentham, Ltd., Birmingham. Houses (552), St. Julian Estate; Graham Hitchcock & Co. Development, Tyllwd Estate; A. E. Sheppard.

North Shields.—Alterations to the Rising Sun Hotel; B. Peele, builder, East Mill Works, North Shields.

Reading.—Smallpox hospital, Manor Farm (£6,470); borough surveyor. Rebuilding offices, Friar Street; Liverpool & London & Globe Insurance Co., Ltd., 1, Cornhill, E.C.

Redditch (WORCS).—Houses (70), Salter's Lane; U.D.C. surveyor.

Richmond (SURREY).—Houses (58), Ham; borough surveyor.

Rickmansworth (HERTS).—Cinema (£28,000) for the Metropolitan Railway Country Estates, Ltd.; A. D. Clare, architect.

Rotherham.—Houses (400), Listerdale; R.D.C. surveyor.

Rugeley (STAFFS).—Houses (25) for U.D.C.; W. E. Rogers, architect.

Ryton.—Cottages (100); U.D.C. surveyor.

Seahouses (NORTHUMBERLAND). — Harbour development scheme (£25,000); L. G. Ross, secretary, Seahouses Harbour Commissioners.

Sheffield.—Church of St. Leonard's, Norwood Estate; E. W. Meredith, architect, 18, Greystones Avenue.

Shipley.—Church of St. Aidan, Baildon; Edward Simpson & Son, architects, 12, Cunliffe Terrace, Manningham, Bradford.

South Elmsall (YORKS).—Houses (48), Albany Crescent, for J. W. Waller.

Southport.—Church, Waterloo Road, Hillside; F. X. Velarde, architect, 3, Abercromby Square, Liverpool.

Stafford.—Houses (81); borough surveyor. Cinema, Newport Road, for W. Dudley, Tillington.

Stockport.—Extensions to the technical college and senior mixed school (360 places), Nangreave Road, for the E.C.; Architects' Department, St. Petersgate.

Stourport.—Houses (60); U.D.C. surveyor.

Stratford-on-Avon.—Houses (24); borough surveyor. Houses (20) for R.D.C.; G. E. Boshier, architect, High Street.

Sunderland.—Hostel for student teachers (£17,000); T. P. Collinge, borough engineer, Town Hall.

Surrey.—School, Morden (£16,000), and school clinic, Walton-on-Thames (£2,500), for the County E.C.; W. W. Finny, secretary, Kingston-on-Thames.

Thorne.—Senior school extensions (£7,000) for West Riding E.C.; T. Jenkinson & Son, builders, Doncaster.

Wallingford.—Houses (30), Didcot; R.D.C. surveyor.

Wallsend.—Flats (48) and houses (72), Bewicke Estate; borough engineer.

Warnham (SUSSEX).—Re-erection of works for the Sussex Brick Co. (£6,000).

Ware (HERTS).—Houses (24) for R.D.C.; Avis & Brooker, builders, Hertingfordbury.

Weetslade (NORTHUMBERLAND).—Houses (36), on the Dudley-Weetslade Road, for T.C.; R. Baxter, builder, Hodgson's Lane, Blyth.

West Riding.—Senior schools, Cudworth (560 places), for County E.C.; H. Wormald, education architect, Wakefield.

Weymouth.—Concrete factory, Chickerell Road, for Mr. Emery.

Whitchurch (SALOP).—Houses (24) for U.D.C.; George Edge, Son & Davies, builders.

Winchester.—Conversion of Lion Brewery into bakery for the Co-operative Society; secretary.